A Database Publication

electron user

Vol. 6 No 2 November 1988 £1.25

RALLY DRIVER

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CHEAT *Create your own Elite Commander*

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We're looking for 77 winners in our latest contest

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A Superior Hit

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ACORN ELECTRON VERSION

Unfortunately it is not technically possible to produce an Acorn Electron version of GRAND PRIX CONSTRUCTION SET. The four games on the Acorn Electron version of PLAY IT AGAIN SAM 4 are: FRAK!, SPELLBINDER, COSMIC CAMOUFLAGE and GUARDIAN.

GUARDIAN — An Alligata Software Hit — received rave reviews when first released.

"It's a classic Defender game . . . and it's very good." . . . A & B Computing.

"A fast-moving space game, with striking graphics and excellent sound effects" . . . Electron User.

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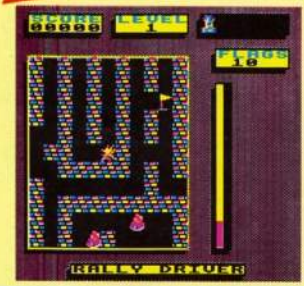

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By Bus: 11, 24, 29, 70, 76 and Red Arrow 507 to Victoria Street – alight Army and Navy Stores.

electron user NEWS

Superior deal brings top games to Electron

BUDGET software house Blue Ribbon has obtained the rights to re-publish 15 Superior Software hit games for the Electron.

It is the first time Superior has allowed its titles to be published by a budget software firm.

The deal covers some of Superior's biggest selling titles including Repton, Thrust, Codename Droid and Crazee Rider.

Because the project is a joint enterprise the games will be released on a new Blue Ribbon/Superior Software label.

Blue Ribbon sales director Martyn Wilson told *Electron User*: "This brings together the two best known names in the Electron games marketplace.

"Electron owners are eager for quality products at a budget price and these games are destined to return straight to the top of the charts".

Superior's managing director Richard Hanson said: "We've been watching the Electron market for some time and are now convinced the time is right for our games to enter the budget arena.

"We expect to achieve a clean sweep of the Electron chart before Christmas".

The back-to-back Electron/BBC Micro cassettes will cost £2.99 each.

Titles – to be released in groups of four at three-monthly intervals – are Percy Penguin, Mr Wiz, Smash & Grab, Repton, Repton 2, Deathstar, Citadel, Karate Combat, Thrust, Galaforce, Stryker's Run, Ravenskull, Codename Droid, Crazee Rider and Syncron.

Blue Ribbon sales director Martyn Wilson (left) and Superior sales manager Ken Campbell shake hands after signing the historic deal

Slogger shows off

THE 20th Electron & BBC Micro User Show, set to take place at the New Horticultural Hall, Greycoat Street, London on November 11 to 13 will provide Electron specialist Slogger with the ideal showcase for its latest releases.

Pride of place goes to the long-awaited Remote Expansion (Rx) – the low-cost upgrade path to a 3.5in or 5.25in system.

And that's backed up by the Plus 2 interface, offering two more cartridge slots, three rom sockets, the RS423 interface and the user port.

Also on show will be the Analogue Interface for Slogger's Rombox Plus and "the ultimate" joystick interface.

Cutting replies win prizes

AS part of the Australian centenary celebrations the Australian Rugby team will be touring this country, and one of the highlights of their visit will be a match against the Barbarians.

And to celebrate the launch of Barbarian for the Electron, Superior Software offered you the chance to watch this historic match and to meet the teams.

In keeping with the theme of the computer game you had to name five swords, and the winning entry came from M.A. Freeman from Edmonton.

He correctly identified the sabre, Roman sword, German dusack, main gauche and rapier – and he'll be off to Cardiff Arms Park in November.

Second out of the winners' sack was Jamil Musa from Bolton.

He will be receiving the Martini A-Z of Fencing, a copy of Barbarian and any two other Superior games of his choice.

Thirty runners-up prizes – a Superior game of their choice – will go to:

J. Wheatley, Grimsby; I. Barrass, Doncaster; R.J. Little, Repton; J. Clifford Davies, Ottery; P. Felton, Colchester; C. Rogers, Winchester; C. Dibble, Thatcham; S. Tell, Hessle; R. Whitehead, Brentwood; R. Webber, Bearsted; A. McDonald, Harborne; A.C. Davidson, Bishops Auckland; C. Pike, Cheltenham; N. Banks, St Albans; C. Hancock, Welshpool; F. Hawkins, Rochford; S. Yap, Chessington; P. Day, Colchester; B. Clarke, Gillingham; T. Woodward, Shrewsbury; N. Williams, Wilmslow; R. Langridge, Braintree; D. Manser, Dover; S. Groombridge, Dartford; L.K. Galpin, Bath; S. Beldon, Leeds; M. Seaburne-May, Aldershot; W. Andrew Ford, Alresford; J. Wilson, Tickton; and C. John, Dudley.

Getting to grips . . .

LATEST innovative product from Thingi and Mouse Pad suppliers Little Office (051-666 1190) is another copy holder.

But this one – Copi Clip – is an injection moulded, ergonomically designed product.

It rotates out of the way when not in use and has a gravity clip for firm grip of the paper being copied. Price £6.99.

Gallup Software Chart

THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	2	SOCCER BOSS *Alternative*	Finally managed to push Barbarian from his pinnacle. Though this is not a new game, it is very good value for money.	1.99
2	•	FRANKSTEIN 2000 *Atlantis*	Highest new entry this month is a new release from Atlantis. This arcade adventure is a far cry from the original Shelley novel.	1.99
3	5	REPTON THRU TIME *Superior*	Back up the charts, this is a must for ardent Repton fans. As you would expect, there are plenty of puzzles and challenges.	6.95
4	1	BARBARIAN *Superior*	If you are a fan of games which simulate physical combat, martial arts and the like, you will find Barbarian an excellent acquisition.	9.95
5	9	COMBAT LYNX *Alternative*	This wartime helicopter simulation sets a mission for the more adventurous. A good introduction to the world of flight simulators.	1.99
6	•	GOLF *Blue Ribbon*	Not one for golf enthusiasts perhaps, but a good quality budget priced game which is reasonably interesting and skilful.	1.99
7	•	DARTS *Blue Ribbon*	Though there are three different games to choose from it soon becomes tedious. Simple graphics and little sound; an adequate budget game.	1.99
8	4	ROUND ONES *Alternative*	Breakout strikes again, with you controlling a B.A.L.L. – a Block Assault Laser Launch. The usual mystery blocks abound.	1.99
9	•	MICROBALL *Alternative*	This one makes a return this month with the highest position since its first appearance in the February issue.	1.99
10	•	DEAD OR ALIVE *Alternative*	Another Alternative title makes a return. As the Sherriff of Dodge City you must watch the bank, jail and your thirst.	1.99
11	11	PSYCASTRIA *Alternative*	World leaders are acting strangely, as their bodies are now inhabited by aliens. By zipping through time you must stop them.	1.99
12	•	CAVERN CAPERS *Alternative*	This scenario has been done before but you can't complain at the price. Everything is here which you would expect in a Scramble game.	1.99
13	•	POWER PACK 2 *Audiogenic*	Highest compilation this month contains seven games which you may have seen before, including Drain Mania, Last of the Free and Psycastria.	9.95
14	•	CREEPY CAVE *Atlantis*	A strange place to lose your keys, but stranger things have happened. Fun, colourful and enjoyable romp chasing a mischievous ghost.	1.99
15	10	AROUND THE WORLD IN 40 SCREENS *Superior*	Repton is still looming large in the charts. This time he is on the trail through the Orient, Africa, Arctic, Oceans and America.	6.95
16	•	BONECRUNCHER *Superior*	Skeletons make excellent soap and sea monsters love bathing, so what is more natural than for you to go hunting the ingredients?	9.95
17	14	PAPERBOY *Elite*	Carrying on wreaking havoc in your neighbourhood with this one. Deliver to your round with the maximum amount of damage.	9.95
18	16	TRIPLE DECKER 3 *Alternative*	The third of 10 Triple Deckers produced by Alternative to date; this one contains Lunar Invasion, Lunar Lander and Jam Butty.	1.99
19	•	FOUR GREAT GAMES 3 *Micro Value*	A fairly average collection of games – Kastle, Goal, US Drag Racing and Space Caverns. Worth the price for the first two offerings.	3.99
20	•	THAI BOXING *The Micro Selection*	This has been popping in and out of the charts now for almost a year. Basically a martial arts game which doesn't seem to age.	1.99

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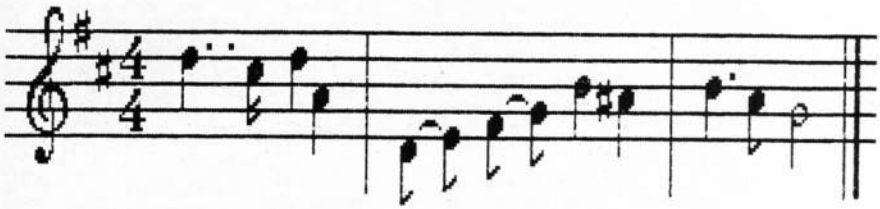


Automated harmonies

IAN WAUGH shows how to make tuneful computerised music with your Electron and Hybrid Music System

MUSICIANS have done many strange things to music over the years in their search for new music styles and forms of expression. Sound can be treated in an almost infinite number of ways with reverb, echo, chorus and delay effects. Sounds can be speeded up, slowed down and altered harmonically, often beyond recognition of the original.

Such experiments have been going on for years – even before the advent of the computer. What has been less common is development in the processing of the actual music lines. Terry Riley brought music processing to more widespread attention with his Rainbow in Curved Air and much serial music uses similar melodic lines in a variety of ways. Even these ideas are by no means new and their origins can probably be traced back to simple rounds such as London's Burning and Frère Jâcques.

All such processing and manipulation is usually produced manually. That is, someone has to physically play all the parts, although they may later be manipulated by signal processing equipment. In many ways this limits the intricacy and complexity of the pieces, as ultimately everything must fit together quite exactly. A task for the computer you might think – and you'd be right.

One of the Hybrid Music System's many unique features is its ability to process music with the Ample language. It can be used to enter traditional music – often quite easily and economically – but it can also be used to apply programming functions to music. As the system gives you full control over every aspect of the finished piece, from instrument creation to the arrangement, you can effectively use the language to alter any aspect of the music.

In case this is beginning to sound like an academic discussion on music composition, fear not: The idea is not as complex as it may appear and it's quite easy to implement in Ample. The results, can be quite musical too, and some pieces I've written have been said to sound like Tangerine Dream and serial and minimalist music.

The piece presented here, There & Back, only processes one aspect of the music, namely the tune itself. The instruments are all predefined and the mix remains static, but do listen to it in stereo if you can.

The entire piece only uses one sequence of five notes which is defined by the word *tune*. The seven parts are panned to different stereo positions and they each play the tune with a different instrument sound and with different note durations. The *rest* is used with FOR loops to delay the entry of the parts.

The first part uses a note duration of medium length and plays it in a middle octave, while *part2* enters at a lower octave and with a note duration half that of *part1*. The third part then enters at a higher octave with a note duration twice that of *part1*. And so on.

The piece builds up until all parts are playing, then they drop out in last-in first-out order.

The piece was originally conceived quite mathematically as a number of parts each playing the riff a certain number of times, at different speeds and at different octaves. Often, during the construction of this type of piece, the musical reality is not as perfect the mathematical model might suggest, proving – to me at any rate – that although maths and music have their links, a good mathematical model does not necessarily produce good music.

In this case, however, very little adjustment had to be made to the original concept other than to alter the number of times each part plays so the music felt right. If you examine the arrangement you will easily be able to see its underlying mathematical structure. The musician and his ear however, are still, ultimately, the final judge.

You can experiment quite freely with the arrangement and here the computer has one enormous advantage over traditional recording procedures – a single part, arrangement or instrument can be altered very easily and quickly without disturbing the rest of the composition. It would, in fact, be virtually impossible to create and edit a similar sort of piece using anything other than a Music Composition Language (MCL) and a computer.

This is a simple example of how Ample can be used effectively to produce interesting – I hope – and viable music. You could apply programming functions to the instruments and the mix so instruments change timbre and stereo position during play. The possibilities are enormous.

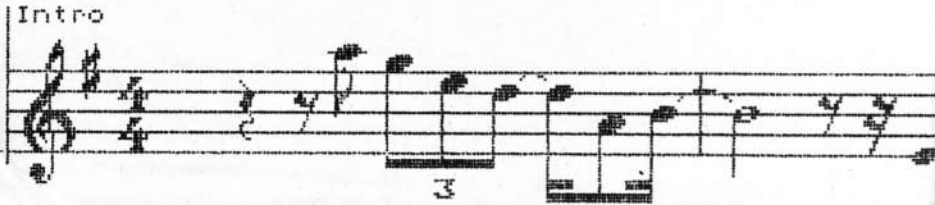
I've composed other pieces using variations on the above idea. I'll pass on a few of the processes I've used which will hopefully stimulate you into producing your own pieces.

One piece uses only one riff like There & Back, but all parts play it at the same time. However, they each use different note durations.

Another piece uses four musical riffs – a bass and three lead riffs. Each part plays its allocated riff with a different instrument and with different note durations. This program, called Adea, was published in the October 1987 issue of *The Micro User*.

Another piece basically uses only one part, but it uses echo to pan successive voices around the stereo image. It also uses the TRANS function to transpose each echo.

You can impose random durations and delays on pieces and you may like to experiment with



```
"RUN" []          "elstring" []   "glock" []
"info" []         "mix" []        "part1" []
"part2" []        "part3" []      "part4" []
"part5" []        "part6" []      "part7" []
"pizzicato" []    "rest" []       "tarimba" []
"tune" []

"RUN" [7 MODE DISPLAY
%              There & Back
%                   by
%                 Ian  Waugh
%               Version 1.0
%
info
"1234567"PLAY
]

"elstring" [2 CHANS
1 CHAN
    1 SHIFT     ON RM
2 CHAN
   -1 SHIFT     128 AMP
EVERY CHAN
 Hollow     Slowvib     Swell
]

"glock" [2 CHANS
1 CHAN
 Clear          Long          Delvib
2 CHAN
  High          Flat          Short
  128 AMP
EVERY CHAN
  ON PHSET
]

"tarimba" [2 CHANS
1 CHAN
 Hard        Vibrato     Long
2 CHAN
 Hard        Flat        Short
  192 SHIFT  128 AMP
EVERY CHAN
  ON PHSET
]

"pizzicato" [2 CHANS
1 CHAN
    1 SHIFT     ON RM
2 CHAN
   -1 SHIFT     128 AMP
EVERY CHAN
 Hollow     Slowvib     Percuss
]

"info" [DISPLAY
%This uses a simple 5-note motif which
%is played by each voice at a different
%octave, stereo position and with
%different note durations. A medium note
%duration begins followed by one twice
%as long then one half as long, etc.
%The piece builds up until all 7 note
%durations are playing at once then they
%fade out the way they came in.
]

"mix" [MSMIX 48,125=T @ MSTUNE
1 SHARE 1 VOICES tarimba
 1 VOICE 128 VOL @ PAN
2 SHARE 1 VOICES elstring
 1 VOICE 128 VOL -1 PAN
3 SHARE 1 VOICES Upright
 1 VOICE 128 VOL 1 PAN
4 SHARE 1 VOICES Moog
 1 VOICE 128 VOL 2 PAN
5 SHARE 1 VOICES pizzicato
 1 VOICE 128 VOL -2 PAN
6 SHARE 1 VOICES Ironpipe
 1 VOICE 128 VOL 3 PAN
7 SHARE 1 VOICES glock
 1 VOICE 128 VOL -3 PAN
PNUM SHARE
]

"part1" [SCORE 24,
112FOR(
1: tune
)FOR
^
]

"part2" [SCORE 48,
4FOR(rest)FOR
48FOR(
-2: tune
)FOR
^
]

"part3" [SCORE 12,
32FOR(rest)FOR
16@FOR(
3: tune
)FOR
^
]

"part4" [SCORE 96,
6FOR(rest)FOR
16FOR(
-1: tune
)FOR
^
]

"part5" [SCORE 6,
128FOR(rest)FOR
192FOR(
3: tune
)FOR
^
]

"part6" [SCORE 192,
5FOR(rest)FOR
4FOR(
@: tune
)FOR
^
]

"part7" [SCORE 3,
384FOR(rest)FOR
128FOR(
2: tune
)FOR
^
]

"rest" [^///////
]

"tune" [aDAD//f/
```

The listing for There & Back

There & Back by substituting random delays in place of the fixed delay before each part enters. Random values can be assigned to any parameter, even notes and instrument parameters. Using random numbers and IF ELSE constructions you can make a part play different riffs.

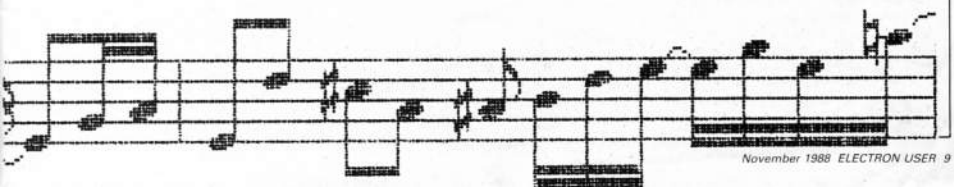
You can experiment with different scales – such as ethnic scales – quite easily, too. A tune can be entered in a traditional key and various key signatures applied to it before playing.

For instance, I wrote a variation on Good King Wenceslas in F (one flat) and then played it with the following flattened notes: B, D and G. Then with these: B, E, D and G to give the piece a gypsy or eastern flavour. It's very easy in Ample to alter the key of a piece and use non-standard key signatures.

All these examples are simple to implement in Ample and I'm sure you can see how difficult – or impossible – they would be to produce using traditional music recording techniques even with a room full of computer-driven Midi sequencers.

Entering There & Back

There & Back runs on Hybrid's Music 5000. A list of the words it uses is given at the top of the listing. You can type the words and their definitions directly into the command area using the same layout as appears in the listing. You only need to enter the approximate number of spaces shown in the instrument definitions. Save the program – just in case – then type RUN.



Adventures

By Pendragon

Help for lost souls

JUST recovered from a bout of Black Death, which has been sweeping the castle like a plague. Something to do with unstructured sanitation programming, so I'm told!

I must begin by giving a volume of thanks to Paul Sanderson and Steven Pettit for marvellous solutions to Project Thesius and Hex, respectively. Thanks also to Mark Deehan for a full audit trail to Escape from Pulsar Seven. These solutions are available to any reader who sends me a stamped self-addressed envelope.

Mr A. McTernan asks for help with Mordon's Quest. I believe that this adventure was originally released by Melbourne House for the BBC Micro. However, I have not seen a copy of it and can offer no immediate help. Can any reader supply me with some information or a map?

Warren Goodwin has sent a 108 move-play through of Sphinx Adventure for which I am most grateful. However, this does not enable completion of the adventure with all the treasures.

A further piece of news concerning the new Robico releases has come my way. Blood of the Mutineers is a 116 location text-only stunner priced £14.95 on disc and £12.95 for the cassette version. It is based loosely on the story of Mutiny on the Bounty and promises to be a Christmas best seller.

This will be followed by a twin cassette graphic adventure entitled Blazing Star. Full details and prices to be announced.

I am continually asked for my opinion about the best adventures to buy and those to avoid. Way back in June 1988 I listed my Top 10 favourite adventures. However, judging by the mail I have received since then, that obviously wasn't good enough for many of you.

Consequently I have compiled a list of every adventure reviewed in the pages of Electron User during the past two years. Alongside each game I have given the date of review, its price at release and the overall mark given to it by the reviewer.

● *The map this month is a logical one of the vaults maze from Classic Adventure. This labyrinth is a true teaser and has been confusing adventurers for over seven years. For an explanation of how to use logical maps see* Electron User *April 1987.*

That's it for this month, so until tunnels stop twisting, happy adventuring.

Problems

Adventure Soft UK, formerly Adventure International has always supported the Electron and BBC Micros with top quality adventures. When I last counted, I discovered this company had released 32 titles for the Electron.

I thought it might be a good idea to collate a section, dedicated to answers to queries concerning each of the adventures. So here goes: A plethora of hints and outright answers for anyone stuck in one of these classics.

Any stalwarts still missing the crown in ***Adventureland*** *should go to the throne room which is by the ledge where the bear was seen. In* ***Arrow of Death Part 1****, Trevor Davies asks how to get into the giant building without tripping. It doesn't matter if you trip over, but don't wake the giant. Try drugging his dinner, Trevor.*

Chris Castell is puzzled over how to get through the water in the gorge in part two of the same adventure. Turn the iron wheel in the stone chamber then return to the gorge. Chris also asks how to move the tiger in ***Circus Adventure****. Try cracking the whip, Chris.*

The Count *is a good adventure for beginners, but still has its fair share of problems. A number of readers have asked where to find the nail file. Enter the solar oven at night.*

Meanwhile in ***Escape from Pulsar Seven****, Matt Johnson must construct a round block on the repaired lathe, to fix the oven. Graham Wright wants help to burn down the tent in* ***The Fantastic Four****. The answer is quite simple: Throw a high flame at it.*

In ***Feasibility Experiment****, Andrew Bassett and Kevin Legrand need to know what they should do at the stone temple. Read the inscription on the altar and pray. The silver cup in* ***Ghost Town*** *will be discovered if you dance in the saloon at the right time.*

Graham Funnel is puzzled over how to feed the salted slugs to the crab in ***Golden Baton****. The instruction is simply, FEED CRAB.*

Golden Voyage*, which is my personal favourite Scott Adams' adventure poses a number of problems for various readers. Perhaps the greatest challenge concerns the stone tablet which should be thrown into the strange fountain in the damp cave.*

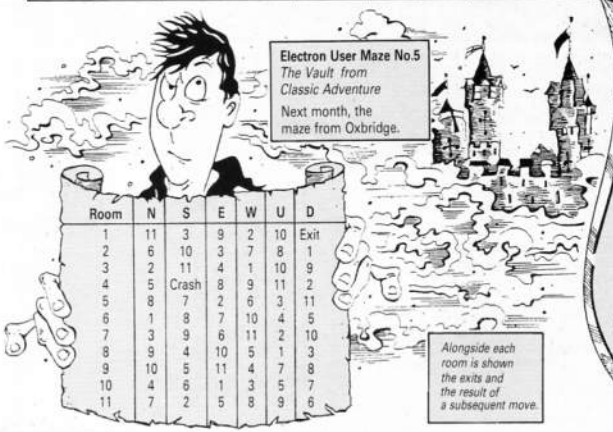
The small stones can be found at three different locations. One is buried in the jungle, one is inside the stone statue and the other is in the hidden chamber. In ***Gremlins****, the mailbox can be cut with the welding torch, but you will need the spark indicator from the kitchen first.*

The Incredible Hulk *is perhaps my least favourite of Adventure Soft's collection and probably reflects a supreme adventure author fulfilling a contractual obligation. Anyone who cannot pull the ring in the first dome should remember their nightmare.*

Kayleth *is a very complex sci-fi adventure in which many die-hards will have to resort to the hint sheet. The puzzle which perplexed me when I first played it was AZAP code DHT. I eventually found it written on the aperture.*

Mystery Fun House *has stymied Mike Berry*

Adventure	Supplier	Reviewed	Price	Rating	Adventure	Supplier	Reviewed	Price	Rating
Adventure 4 Pack	Potters	Mar 1987	£5.95	9	Operation Safras	Shards	Feb 1987	£7.95	8
American Suds	Riverdale	Aug 1988	£4.00	9	Oxbridge	Tynesoft	Dec 1987	£7.95	8
Axe of Kolt	Elk Adventure Club	Jul 1988	£5.95	8	Philosopher's Quest	Topologika	Jun 1988	£9.95	9
Countdown to Doom	Topologika	Aug 1988	£9.95	9	Project Thesius	Robico	Sep 1986	£9.95	9
Dreamtime	Heyley Software	Apr 1988	£7.99	8	Puppet Man	Larsoft	Oct 1987	£3.95	9
Enthar Seven	Robico	Sep 1986	£16.95	9	Saga of a Spy Trilogy	Robico	Oct 1987	£23.95	10
Ferryman Awaits	Kansas City	Feb 1987	£4.95	7	Scoops	Adventure Soft UK	Apr 1988	£9.99	6
Galadriel in Distress	Potters	Dec 1986	£2.95	6	Starship Quest	Elk Adventure Club	Apr 1988	£4.95	8
Hex	Larsoft	Jun 1988	£3.95	9	Stranded	Heyley Software	Sep 1988	£7.99	8
The Hunt	Robico	Dec 1987	£9.95	10	Suds	Riverdale	Nov 1987	£4.00	8
Ket Trilogy	Incentive	Aug 1987	£9.95	5	Taroda Scheme	Heyley Software	Sep 1988	£7.99	8
The Lost Crystal	Epic	Aug 1987	£11.95	10	Twin Kingdom Valley	Bug Byte	Sep 1986	£2.99	9
Magnetic Moon	Elk Adventure Club	Jul 1987	£4.95	8	Twin Orbs of Aalinor	Potters	Dec 1986	£3.95	8
Myorem	Robico	Oct 1986	£9.95	10	Village of Lost Souls	Robico	Dec 1987	£9.95	10
Nine Dancers	Larsoft	Mar 1987	£3.95	8	Wychwood	Larsoft	Jun 1987	£3.95	8



Electron User Maze No.5
The Vault from Classic Adventure
Next month, the maze from Oxbridge.

Room	N	S	E	W	U	D
1	11	3	9	2	10	Exit
2	6	10	3	7	8	1
3	2	11	4	1	10	9
4	5	Crash	8	9	11	2
5	8	7	2	6	3	11
6	1	8	7	10	4	5
7	3	9	6	11	2	10
8	9	4	10	5	1	3
9	10	5	11	4	7	8
10	4	6	1	3	5	7
11	7	2	5	8	9	6

Alongside each room is shown the exits and the result of a subsequent move.

Adventurer's Glossary

Paddle: Use it to row a boat or a raft.
Pan pipes: Play these to charm the snake.
Parchment: Read it to gain important insight. You may have to decode invisible writing first.
Passages: Usually part of a maze, so start mapping!
Paybox: Drop a coin in here to cross a bridge or enter a tunnel.
Pendant: Wear it on a chain.
Phial: Must be filled with something potent.
Phoenix: Let this mythical beast follow you.
Pirate's chest: May contain treasure or hide an escape hatch. Take extreme care when opening it.
Plank: Use it to cross a gap, quicksand or a ravine.
Pool: Drink at it. You may even swim in it, but don't carry too much.

Solved

and Ian Richardson. You can't open all the locked doors. The store room can be opened with the rusty key, but the other doors remain permanently locked. Ian Ballard must examine the parchment, go to the pedestal then fly north if he is to solve ***Perseus and Andromeda****. Elsewhere Elaine Agan wants to know how to open the chest in* ***Pirate Adventure****. Use the claw hammer to remove the nails, and look under the rug, Elaine.*

Pyramid of Doom *is causing problems for Alec Mitchell. Leave the purple worm alone, throw the ruby at the statue, and feed the oyster, Alec. In* ***Rebel Planet****, John Tyler might survive a little longer if he realises that the flashing light from the strobe will stop the snake from attacking him.*

Stephen Bezer's marvellous map of ***Robin of Sherwood*** *has enabled me to offer the following snippet of advice to Richard Barlow and Craig Rowe. Get Siward and find the serf before boarding the cart which will take you to Nottingham.*

Sue Mellor and Del McKee ask how to rebuild the raft in ***Savage Island 1****. You should have cut a second set of vines. After meeting Argh in* ***Savage Island 2****, you should use the flower to knock him out, then drag him to the eastern red metal room.*

Lucy Kukstas writes to ask how to defuse the bomb without it exploding in ***Secret Mission****. This is too complex to answer in full, but try reading the sign in the control room, Lucy.*

The Sorcerer of Claymorgue Castle *was one of Scott Adams' last adventures – and one of his most difficult to boot. Adrian Davies and Chris West must use a spell to dissolve the rope which supports the chandelier. But take care that you don't hang around underneath it, fellas.*

Spiderman *is baffling Jayne West. To get the printing presses running, you must load the scale and use the computer. When you find the strange cloud jump for one location then return and go up.*

For anyone who has not yet discovered it, avoid the black hole in ***Strange Odyssey****.*

Temple of Terror *is Adventure Soft's most recent game, and I must admit that I have not yet played it to its conclusion. However, I did discover that it was a good idea to kick sand in the guard's face and to poison the dog. Does that help anyone?*

In ***Ten Little Indians****, Sue and Simon Shield should wait on the train and disembark at the second stop. Meanwhile in* ***The Time Machine****, Sue and Simon must feed the Brontosaurus with the biscuits. Seems an illogical thing to do. Fiona Reynolds and Tom Johnstone should climb the chimney and push the button in* ***Voodoo Castle*** *to be rewarded by the sweep.*

In ***Waxworks****, Steven Barker must wear the talisman and eat the leaves if he is to succeed. We have to do strange things in adventures.*

Finally, the age old fox, chicken and corn puzzle raises its ugly head in ***Wizard of Akyrz****. Try hiding the chicken then feeding them. Contented chickens usually lay a lot of eggs.*

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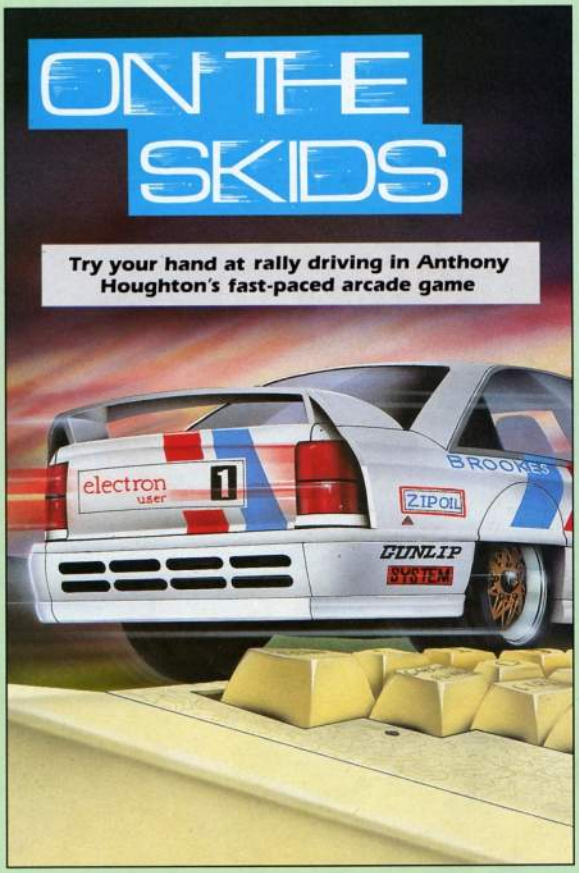
ON THE SKIDS

Try your hand at rally driving in Anthony Houghton's fast-paced arcade game



HAVE you ever watched rallying on the television and wished you could have a go at this exciting sport? Well now you can with Rally Driver – a test of reactions, sense of direction and manual dexterity.

The action takes place in a large town which takes on the appearance of a 32 by 32 character maze, but the screen only displays a small section of it at a time, scrolling to show your immediate surroundings as you drive around.

Your car is a fast turbo charged roadster and the object is to scour the town for strategically placed flags. When you find one collect it by running over it. Try to pick them all up within the time limit and then you'll be allowed to progress on to the next stage of the rally. If you don't, you'll be knocked out of the contest.

There are two hazards to watch out for – boulders blocking the road and rogue cars aiming to eliminate you from the rally by ramming you. Fortunately you have a couple of back up cars in case you write one off.

At first there is just one rogue car, but this figure increases every other level up to a maximum of eight, and each one has a fixed start position. There can be up to 61 rocks, which are picked at random from a list of positions. This ensures that flags are not completely blocked off.

Control instructions are included in the game, and although the sound on/off feature is event driven and can be used at any time, the pause can only be used from the machine code loop – that is, not when you are in the process of losing a life or receiving a bonus.

The long pause during the instructions and between each level is to allow the next maze to be set up. To keep the maze as compact as possible the walls and passages are stored in binary code and the rocks, flags and cars added afterwards. To stop the wait from being too inconvenient it is placed where you would normally expect a pause anyway, but perhaps not quite as long.

CONTROLS

Z	Left	*	Up
X	Right	?	Down

```
   10 REM Rally Driver
   20 REM By Anthony Houghton
   30 REM (c) Electron User
   40 *FX13,4
   50 ENVELOPE1,1,10,-1,0,5,90,0,126,0
,0,-126,126,126:ENVELOPE2,1,50,-20,10,
4,10,10,126,0,0,-126,126,126
   60 PROCgraphics:PROCassem
   70 REPEAT:MODE5:VDU23,1,0;0;0;0;19,
3,4;0;:Level=1:Lives=3:PROCinst:PROCma
ze:PRINT'Press SPACE to play";:*FX21
   80 REPEATUNTILGET=32:PROCscreen:CAL
Lflagp:REPEAT:PROCupdate
   90 ?carx=10:?cary=11:?cardir=&60:?n
ewcd=&60:CALLwindow:TIME=0:REPEATUNTIL
TIME>30
  100 CALLmain:IF?dead=100ANDlives<5PR
OCnewlife:GOTO100
  110 IF?dead=27UNTIL1:UNTIL0
  120 IF?dead=&E0PROCbonus:UNTIL0 ELSE
IF?dead=&FF SOUND&11,1,50,13:PROCwindo
w(4,15,9,14,3,0):COLOUR128:COLOUR2:PRI
NT'OUT OF FUEL";:VDU26
  130 IF?dead<>&FF SOUND0,-15,4,10:!sc
r=&AB06C60:CALLprint
  140 FORN%=0TO?enmss:X%=enmx?N%:Y%=enm
y?N%:A%=Y%*32+X%:maze?A%=0:NEXT:PROCen
emies
  150 TIME=0:REPEATUNTILTIME>200
  160 lives=lives-1:UNTILlives=0:PROCw
indow(4,18,9,17,3,0):COLOUR128:COLOUR2
:PRINT' GAME  OVER";:VDU26
  170 TIME=0:REPEATUNTILTIME>200:RUN
  180 DEFPROCbonus:PROCwindow(2,17,10,
15,1,0):COLOUR2:PRINT'  LEVEL     ";le
vel;TAB(8)"COMPLETE";:VDU26
  190 FORN%=1TOlevel*10:CALLinsc:IF?de
ad=100ANDlives<5PROCnewlife
  200 CALLpscor:NEXT
  210 FORN%=100TO200STEP5:SOUND1,-15,N
%,1:NEXT:REPEAT:FORN%=1TO4:CALLfuel:NE
XT:SOUND&10,-15,6,1:CALLinsc:IF?dead=1
00ANDlives<5PROCnewlife
  220 CALLpscor:UNTIL?dead=255:level=L
evel+1:PROCmaze:CALLflagp:ENDPROC
  230 DEFPROCnewlife:?dead=0:lives=liv
es+1:PROClives:SOUND3,-15,220,5:SOUND3
,0,0,5:SOUND3,-15,220,5:ENDPROC
  240 DEFPROCscreen:CALLdither:PROCwin
dow(1,27,11,6,2,0):PROCwindow(4,30,15,
30,0,2)
  250 VDU26:COLOUR0:PRINTTAB(4,30)"RAL
LY DRIVER";:PROCwindow(14,6,18,5,0,2):
COLOUR3:PRINT'FLAGS";
  260 PROCwindow(1,2,5,1,0,2):COLOUR3:
PRINT'SCORE";:PROCwindow(7,2,11,1,0,2)
:COLOUR3:PRINT'LEVEL";
  270 PROCwindow(13,2,18,1,0,0):PROCwi
ndow(14,27,14,9,0,0):PROCupdate:ENDPRO
C
  280 DEFPROCupdate:VDU26:COLOUR130:CO
```

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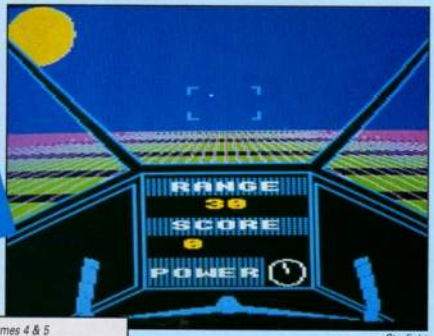
Budget sports and arcade action



Starfight

Product: Triple Decker volumes 4 & 5
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Tel: 0977 797777

NOT too long ago it was considered to be good value if you could pick up an arcade game for £1.99 – nowadays Alternative Software is churning out three-game compilations at the same price.

A sporting theme is in evidence on Triple Decker volume four, with Cricket, Golf, and Fishing as the pastimes on offer.

Howzat represents the next step up from the old fashioned, pencil, paper and dice game that was popular when I was a lad – everything is still reliant upon random numbers, but the game is acted out on the screen to add extra interest.

Players' names for the two teams involved may be typed in, or you may choose to use the pre-programmed English and Australian teams.

A rapidly drawn aerial view of the pitch and players is displayed for your entertainment – the grass is green and the stick-men are black: Hardly state of the art, but adequate for this game.

From this point onwards life becomes very straightforward: The bowler bowls, the batsman bats, and you are asked whether you wish to run. Howzat is a very simple game – yet enjoyable to play.

Game number two of the compilation is Golf – for up to five players. The aim of the game is to complete the nine hole course in the least number of shots, although I doubt whether many people will have the stamina to complete a single incredibly long round.

Using any of the eight compass directions you guide a white dot along a map of the hole, eventually reaching the large black dot at the far end. All of this excitement was far too much for me, so I loaded up game number three – Fishing.

"How on earth do you translate the sport of fishing into a computer game?" I hear you ask – "very successfully", says Alternative Software.

You are provided with such vital information as weather conditions, water speed and depth, from which you must make the correct choice of hook,

Monster time

PREVIEW

FRANKENSTEIN 2000, a new Budget title from Atlantis, has taken the Gallup software chart by storm and has gone straight in at number two. In it, you play the part of Freddy Frankenstein who has just inherited the castle of his great grandfather. Following family tradition, on discovering the body of the legendary monster, you set out to restore life to the creature.

You board a submarine, and with the aid of modern technology, are shrunk to the size of a pin head. You enter the body and make your way to the brain. Here surgery must be performed in order to repair the defects which previously turned the monster into a homicidal killer.

In all, there are four parts of the monster's anatomy for you to navigate before reaching the brain. Of course, you must destroy or overcome all of the obstacles you encounter along the way. A full review will appear in next month's *Electron User*.

Making

Price: £2.99 (tape)
Supplier: Impact Software, Neepsend House, 1 Percy Street, Sheffield, S3 8AU.
Tel: 0742 769950

AFTER I started the Arcade Corner column I began receiving, at regular intervals, copies of The Pokes Disc, a collection of pokes and cheat routines for many of the best-selling Electron games.

These offered exceptional value for money: Priced at the level of a budget game, they offered help – in the form of pokes, passwords, hints and tips – for almost every possible aspect of many of the top games.

This enterprising venture was the brainchild of Mark Gidley, a highly talented individual who also devised all the pokes.

Cheat It Again Joe is, in effect, an updated version of Mark Gidley's Pokes Disc, with Impact Software's marketing muscle behind it. It comes as two volumes – with a third being released soon – on either tape or disc, and each is available separately. However, the two really complement each other, and I would certainly recom-

bait, and weights. Out on the well-drawn river bank you decide whether to cast near or far and at what depth.

With your bait in the water you can settle back and wait. Within seconds your float will begin to twitch. Hand hovering above the spacebar you poise, ready to strike: The float goes under completely and bang – you're into your first fish. For the ridiculous sum of 67 pence you couldn't find a better game.

Volume five comprises two space games and a karate program. Offering number one is Starfight and represents shoot-'em-ups at their most basic.

The screen displays the view from your cockpit as you orbit the planet M101/3. A small blip appears and begins to increase in size as it approaches – using four poorly chosen keys your job is to blast the blip.

An on-screen range finder counts down as the alien ship homes in on your position – the further away the target, the more points you score if you hit it. When the range finder reaches zero, you lose your one and only life. Starfight is an ordinary game that is made worse by a terrible choice of control keys.

Golf

Skramble

Skramble, as you might expect, is a horizontal scrolling zap-and-blast game. A continuous stream of alien ships and missiles fly smoothly from right to left across the screen – all you have to do is shoot them. Blasting the aliens is actually quite easy – they fly in perfectly straight lines and don't fire back.

The alien plan is to defeat you through sheer strength of numbers – after a couple of minutes flying time you will find yourself struggling to clear a path through the alien swarm. Shooting them doesn't help as this merely converts the alien into a fireball that continues on its original course. Good use of colour and smooth animation make Skramble a worthy addition to this collection.

Game number three brings you back down to earth with a bump, a kick, and a nasty looking punch. Karate Warrior is a fine looking game that has one major failing – it can only be played by two players. As with all martial arts games your success is dependent upon your ability to string together a winning combination of kicks and punches. The usual selection of 16 moves has been reduced slightly, to a grand total of four.

The two single-colour warriors perform their ritualised combat with flicker-free ease, it is such a pity that the computer is unable to defend itself – Karate Warrior could have easily been a good game.

It's worth noting that this budget collection consists of some of the best games from the pages of *Electron User*. In spite of the varied quality of some of them, you will have to search far and wide to find better products at this price.

Jon Revis

Sound	5
Graphics	6
Playability	7
Value for money	9
Overall	7

SecondOpinion

THERE's something for everyone here, with three excellent sports simulations and as many exciting arcade games. The golf can become tedious as it takes so long to play, but Fishing is quite fast-paced. I enjoyed Skramble and Karate Warrior, though the latter would be better if it also had a single player option. Starfighter is probably the simplest of all the games, but is nevertheless enjoyable.

Janice Murray

things easy for gamers

mend buying them together.

When I first heard that Cheat It Again Joe was under development, my feelings were mixed. Certainly, this sort of product could raise a number of problems, both legal and moral. When I received my copies, however, I was glad to see that Cheat It Again Joe avoids any such transgressions. The cheat routines are themselves encrypted and give nothing away to anyone who manages to disentangle them.

In common with its Pokes Disc predecessors, Joe offers exceptional value for money to fans of many of the major titles released in the last couple of years. For a mere £3, tape owners receive a generous selection of pokes for 20 top titles. However, disc drive owners fare even better: For an extra £2 they get pokes for the disc versions of 20 games, plus all the pokes from the cassette.

Cheat It Again Joe is certainly rather unusual, in that – to the best of my knowledge – it is the first offering of its kind released by a major company.

I have often received letters saying that routines featured in my column have drawn old games out of the cupboard and given them a new lease of life; Joe offers the same.

The collection seems to have been designed with the novice user – or at least the novice hacker – in mind, and a great deal of thought has been put into making the system easy to use. The tape or disc is loaded in the usual way: CHAIN"" and Shift+Break respectively. Once the first part has finished loading, the micro presents you with a list of names of the games featured in that volume.

Using the cursor keys moves a highlight bar up and down the screen and pressing Return selects the game. Alternatively, pressing spacebar presents another page of game titles. When you've selected a game the micro tells you about the cheat facilities provided for it and another press of the spacebar brings up a request for the version of your game.

In some cases, such as Superior's Repton 2, Joe caters for both the original stand-alone game and a compilation version.

The disc version of Joe caters for all four versions of Repton 2 – the original tape, the original disc, the Superior Collection tape and the Superior Collection disc.

Once the version is selected the appropriate poke routine is loaded and you are prompted to insert the tape or disc. Follow the on-screen instructions and the game will load, apparently normally, but with all the promised modifications in place.

As one who can claim to specialise in this sort of thing, I know how long Mark must have spent devising the pokes in these compilations, and the result is very worthwhile.

Martin Reed

Sound	N/A
Graphics	N/A
Playability	9
Value for money	10
Overall	9

SecondOpinion

ORDINARY games players often need help when tackling difficult arcade games. Would I use it? Not on your Nelly! I'm determined to master the games the hard way.

Janice Murray

Io, Io it's off to work we go

Product: Pipeline
Price: £9.95 (tape)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

PIPELINE is set in the far future where in an effort to supplement the Earth's dwindling supplies of sulphur, a mining operation was established on Io – one of Jupiter's moons. However, recent volcanic activity has surrounded the robot-controlled mining platform with a sea of burning sulphur.

So desperate is Earth's need for the precious element that you have been despatched to Io to collect every single drum of sulphur and close down all four mining platforms.

Arcade adventure games have become something of a trademark for Superior Software – classics such as Ravenskull and the Repton series have proved popular with many Electron and BBC Micro users.

The dimensions of Pipeline make Repton look like a screen from Pacman. If you were impressed when you first examined the map of Repton 3, prepared to be amazed by the Pipeline layout – each of the four levels is twice the size of a Repton scenario.

Ever conscious of the value for money that is offered by the budget software houses, Superior has beefed-up the Pipeline program into a top notch all singing, all dancing software package. Not only do you receive the best arcade adventure game on the market, you also get character and level designers and a mission generator. Superior is even offering to market the best original game created with these utilities.

At first glance Pipeline very much resembles Ravenskull – the action is viewed from above while a space-suited hero scuttles around a beautifully drawn, yet frequently deadly, maze.

The inner reaches of the mining platform

As you appear at the start of level one it doesn't take long for you to realise that you have materialised inside a completely sealed compound. Ignoring this fact for the moment you begin rounding up sulphur drums.

By the time you have collected all the available sulphur you have also found a remote control unit and a set of blueprints. The remote control has little effect, but the blueprints teleport you to the inner reaches of the mining platform.

The "inner reaches" in which you appear just happens to be a room with two exits – the first guarded by a control robot, the second blocked with a locked manhole cover. It is at this point that you are expected to discover the significance of the remote control unit – it moves manhole covers.

Examination of your immediate surroundings reveals a distinct lack of sulphur drums – it is now time to enter the pipeline. This is a complex network of pipes through which the sulphur is normally pumped. Since the platform is no longer active it can be used as a means of getting from A to B – unfortunately you have no idea where position B is located.

Grasping your courage with both hands you step into the pipeline. Using multi-directional scrolling of breakneck speed the display traces your passage through the twisted network of pipes. If you are lucky the terminus will not consist of a bubbling sulphur pit or an oncoming fireball.

Flames can be of two types – stationary or mobile. The former are only a problem when you are racing to complete the level before the countdown expires, but the latter follow predetermined routes through their own sections of maze and are a major cause of premature death, mainly due to their rate of travel. You can only see a small proportion of the maze so you are very vulnerable to a charging fireball.

Peruvian adventure

Program: In Search of Atahaulpa
Price: £2.50 (tape – mail order only)
Supplier: Lee Software, 35 Osprey Gardens, Worle, Weston-super-Mare, Avon BS22 8UN.

THE rush of new software blood into the Electron continues with this first release from Lee Software. Although In Search of Atahaulpa is written using Gilsoft's Quill utility, I am quite impressed by the breadth of imagination and complexity of puzzles displayed by the author, Anthony Lee.

Atahaulpa was the last Inca ruler of Peru. In 1532, shortly after he took the throne, Francisco Pizarro – a Spanish conquistador – and his men landed in Peru, ravaged the countryside and dethroned Atahaulpa. Many valuable artefacts were lost during this period, including a gold statue of the Inca king.

The adventure is set in more recent times after the location of the statue has been discovered by a Brazilian archaeologist. Subsequently you have been hired by the National Geographic Society to recover the statue, but you are not the only person in pursuit of this priceless treasure.

Load the tape and within a minute you are presented with five pages of informative loading screens which set out the scenario and help create atmosphere for the undertaking which follows. After a couple more minutes you begin your quest in earnest as you find yourself standing in a small Inca market town.

A thorough investigation of the area is recommended by using the routine E, W, N and S movement commands. I would also suggest that you try entering some buildings, reading the signs and waiting at significant points. One of the early problems you will face is how to retrieve a book from the library. Try waiting at the librarian's desk until she returns, and keep your eyes open.

Perhaps the most perplexing problem is how to get rid of the swarthy stranger who dogs your footsteps. The answer is linked to the discovery of the book and is by no means simple. Perhaps Jules Verne was right and a spot of ballooning could help.

Later in the game you will have a crevice to enter and a crevasse and river to cross. Each requires logical thought and specific action if you are to succeed and survive. There is also an excellent forest maze which needs mapping in an off-beat manner, and a spider and some vicious ants to avoid.

The creation of atmosphere and a good parser are limited by the usual restrictions of the Quill. However, Anthony has succeeded in presenting us with a real teaser of an adventure – some of the puzzles defy instant solutions – at a real bargain price. Order Atahaulpa today.

Pendragon

SecondOpinion

In Search of Atahaulpa is an interesting adventure, and is slightly different from the more usual trolls and goblins scenario. The puzzles are clever and the text is quite atmospheric. For a first attempt Lee Software has come up with a commendable game.

Janice Murray

Presentation	*6*
Atmosphere	*5*
Frustration factor	*9*
Value for money	*10*
Overall	*8*

SecondOpinion

I'M a great fan of Superior games and this is just as addictive as its other hits Repton and Ravenskull, and includes the best features of each game. The puzzles are excellent and the graphics superb. This is a game you'll keep coming back to time after time, and once you've completed it you can have a bash at designing your own.

Janice Murray

A masterpiece of brain twisting entertainment

There are 16 different objects to be found in a maze, including mallets, space burgers, spanners, magnets, lasers, explosives, detonators and one control robot. As you might expect, Superior is very cagey as to the function of these objects, but I managed to find a use for a couple of them.

My initial guess at the use of the space burger was that it would reset the countdown timer – it didn't. In actual fact it gives you the ability to manhandle the large wooden crates. Using your new found strength you can access previously blocked pipelines, or trap moving fireballs within alcoves.

Following a 10 minute session of bashing everything in sight with the mallet, it was the crates that proved susceptible to its subtle persuasion. The explosives/detonator combination proved singularly ineffective in every location that I tried – except one. And even then I couldn't see what I had achieved by blasting the wall concerned.

Pipeline is a masterpiece of brain twisting entertainment, if Rubik ever turned his hand to computer programming he would produce something like this.

Jon Revis

Sound	*10*
Graphics	*10*
Playability	*10*
Value for money	*10*
Overall	*10*

Space capers

Program: Rebel Planet
Price: £7.95 (tape)
Supplier: Adventure Soft (UK) Ltd., P.O. Box 786, Sutton Coldfield, West Midlands. B75 7SL.
Tel: 021-378-1371

WHEN I was in the salad days of my youth, I enjoyed curling up with a copy of a Biggles or Jennings book. Nowadays, it seems, most 12-year-olds idle away their time reading Jackson and Livingstone Fighting Fantasy adventures. How I longed to see Biggles on the TV, but never did.

Today, however, many youngsters' dreams are answered as Fighting Fantasy has now reached the screen, all be it on a computer monitor. Rebel Planet was the first of this type of adventure I had seen. It is a far cry from the likes of Rick Hanson or Sphinx, as fans of Fantasy role playing books will realise.

The adventure takes place on a merchant space craft called Caydia and three planets in the evil Arcadian Empire. Your task is to locate resistance rebels then destroy the invaders' Queen computer, before it destroys you.

As with many other adventures you spend most of your time collecting artefacts to solve the problems you encounter on your journey: But there the similarity with other adventures ends. You have to cope with a dispenser on the space craft, into which you must regularly insert a card.

A digitised relation of K9 shuttles around while you are on the good ship Caydia. You also have to manage to advance or retard time to ensure you don't miss your transport.

To be successful you must deal with various random conflicts which have to be resolved in order to continue. That is not to say that battle is always the best course of action. For instance, an Arcadian guard needs to be payed rather than killed, and the patrols should be avoided at all costs, especially if the odds are against you.

It is also worth talking to any characters you meet as even Arcadians may give valuable information. I really enjoyed the live feel of the game generated by the character movements, even if I found them a little irritating to the general solving of the adventure.

My only real criticism of this adventure – once I had made the quantum leap from the usual fare I come across – was the dire lack of location description. Hence I still feel that Rebel Planet lacks a lot of the atmosphere which you would find in the book.

I also found the parser rather limited, but having said that, I am looking forward to seeing the second in this series: Seas of Blood. All in all, a good romp which I would recommend to anyone who would like a deviation from the usual.

Pendragon

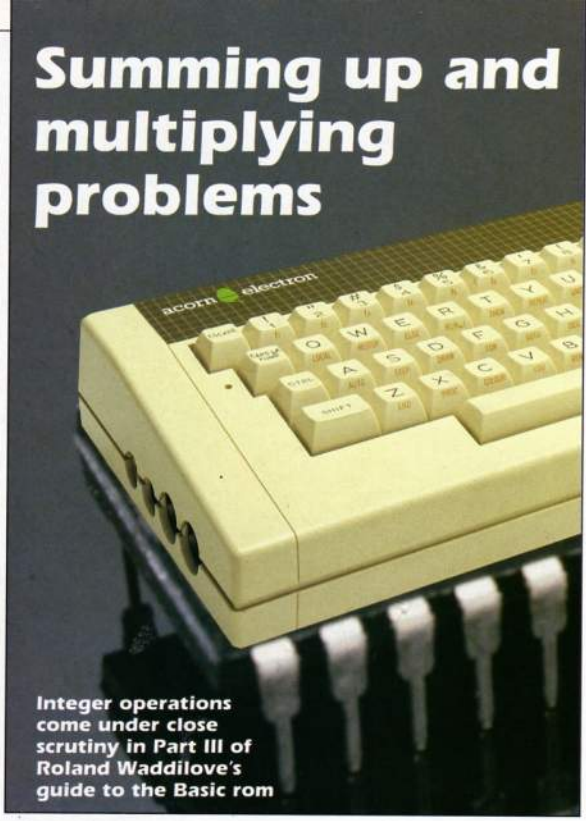
Presentation	*9*
Atmosphere	*5*
Frustration factor	*7*
Value for money	*8*
Overall	*7*

SecondOpinion

REBEL Planet is an unusual adventure, and this alone makes it worth while considering. However, the poor location descriptions and the lack of good command parser may put off some adventurers. If these were improved slightly it would make a tremendous difference to the game.

Janice Murray

Summing up and multiplying problems



Integer operations come under close scrutiny in Part III of Roland Waddilove's guide to the Basic rom

So far in this series of articles examining some of the many machine code subroutines in the Basic rom I have shown how variables are handled and how Basic programs are stored and listed on screen. The subroutines are all available to the assembly language programmer, and using them in your own programs can significantly cut down on the amount of code required, and its complexity.

In this article we'll see how to perform simple integer arithmetic using the Basic rom's add, subtract and multiply routines (but not division – I'll explain why later). Although these aren't difficult to program yourself, why bother when they have already been written for you?

All integer operations involve Basic's integer accumulator – or scratchpad – somewhere along the line, and this consists of the four bytes located at &2A in zero page. There is a convenient routine located at &AED8 in the Basic rom which will transfer the number in the A register to IntA. Program I below demonstrates this.

I have called the routine *lodia* and the program simply asks you to input a number, which is then loaded into the A register. A JSR to *lodia* stores the number in IntA, and this is loaded into A again and printed out as an Ascii character by the familiar oswrch at &FFEE.

This is fine, but it does have quite a serious drawback in that it can only store an 8 bit number in IntA – the maximum size number you can fit in the A register. However, by combining the A and Y registers to form a 16 bit number and calling *lodiay* at &AEEA you can handle numbers up to 65535 as Program II shows.

The normal size for an integer in BBC Basic is four bytes or 32 bits, and as you might expect there are routines built into the rom to handle numbers of this size. A four-byte number stored in zero page can be transferred to IntA by the routine at &AF56 called *lodi0*, and copied back with *stori0* at &BE44. These routines take the address to copy from or to in the X register.

```
10 REM PROGRAM I
20 INPUT "Enter Ascii code:"n
30 lodia=&AED8
40 P%=&900
50 [ OPT 2
60 \Call lodia with code in A
70 LDA #n
80 JSR lodia
90
100 \Print Ascii code in IntA
110 LDA &2A
120 JSR &FFEE
130 RTS
140 ]
150 CALL &900
```

Program I

```
10 REM PROGRAM II
20 INPUT "Enter number:"n
30 IntA=&2A
40 lodiay=&AEEA
50 P%=&900
60 [ OPT 2
70 \Call lodiay with number in YA
80 LDA #n MOD 256
90 LDY #n DIV 256
100 JSR lodiay
110
120 \Copy IntA to &70
130 LDA IntA:STA &70
140 LDA IntA+1:STA &71
150 LDA IntA+2:STA &72
160 LDA IntA+3:STA &73
170 RTS
180 ]
190 CALL &900
200 PRINT "IntA=";!&70
```

Program II

To demonstrate this Program III asks for an integer which it then stores in zero page at &70. It copies the number to IntA, negates it by calling a routine called *negi* at &AD93, and copies the result to &80. Run it to check that the results are as expected:

```
10 REM PROGRAM III
20 lodi0=&AF56
30 negi=&AD93
40 stori0=&BE44
50 P%=&900
60 [ OPT 2
70 \Copy &70 to IntA
80 LDX #&70
90 JSR lodi0
100
110 \Negate IntA
120 JSR negi
130
140 \Copy IntA to &80
150 LDX #&80
160 JSR stori0
170 RTS
180 ]
190 INPUT "Enter number:"n%
200 !&70=n%
210 CALL &900
220 PRINT !&80
```

Program III

So far, so good, but now we'll see how to add two numbers together using the Basic rom's built-in routines. This is slightly more complex. Basic uses a stack structure for calculations, and this is not to be confused with the 6502's stack in page one. A stack pointer is stored at &04/&05, and the structure grows down from HIMEM.

The routine to add two numbers – *addi* at &9C5B – expects one number to be on the stack and one to be in IntA, so this must be set up before calling it. How do we put a number on Basic's stack? Again, predictably, there's a subroutine to do this in the rom, and it's called *pushi* at &BD94. It pushes the number in IntA on to the stack.

Program IV prompts for two integer numbers which it then stores in zero page. The first is copied to IntA, then it's pushed on to the stack. The second is copied into IntA and the two numbers are added by calling *addi*. The result is conveniently left in IntA, so this is copied to &80 and

Basic prints out the answer:

```
 10 REM PROGRAM IV
 20 addi=&9C58
 30 pushi=&BD94
 40 lodi0=&AF56
 50 stori0=&BE44
 60 P%=&900
 70 [ OPT 2
 80 \Copy &70 to IntA
 90 LDX #&70
100 JSR lodi0
110
120 \Stack IntA
130 JSR pushi
140
150 \Copy &74 to IntA
160 LDX #&74
170 JSR lodi0
180
190 \Add IntA to stack, IntA=result
200 LDX #0
210 JSR addi
220
230 \Copy IntA to &80
240 LDX #&80
250 JSR stori0
260 RTS
270 ]
280 INPUT 'Enter number1:'n1%
290 INPUT 'Enter number2:'n2%
300 !&70=n1%
310 !&74=n2%
320 CALL &900
330 PRINT 'Result=';!&80
```

Program IV

Subtraction is identical to addition, so I won't provide you with a worked example as you can easily alter Program IV. All you need to do is change *addi* to *subi* and the address is &9CC2. By the way, if you are wondering why the X register is zeroed before calling *addi* or *subi*, it's because these subroutines are part of Basic's expression evaluator and they can cause problems if X is equal to the Ascii codes for plus or minus.

Finally comes multiplication, and this again is very similar to addition. The routine is called *muli* and is located at &9D6D. One number is stored in IntA and the other should be on the stack. The result is to be found at IntA as would be expected, however, the absolute value is also available at &39 to &3C. Program V shows this in operation.

A point to note is that &27 must not be equal to the Ascii codes for multiply or divide, or the tokens for DIV or MOD, as again the routine is part of the expression evaluator and problems can occur with these values. In Program V it is set to zero to be on the safe side.

I would have liked to round off this article with an example of integer division, but for the life of me, I can't get it working. The routine *divi* is located at &99E8, and the entry conditions should be IntA equal to the divisor, &39-&3C equal to the dividend and &3D-&40 set to zero. The quotient should be at &39 with the remainder at &3D, but it doesn't quite work as expected, though it nearly does. Can anyone fathom out what is going on?

● *That's all for now: Next month we'll move on to examine some more useful rom routines.*

```
 10 REM PROGRAM V
 20 muli=&9D6D
 30 pushi=&BD94
 40 lodi0=&AF56
 50 stori0=&BE44
 60 P%=&900
 70 [ OPT 2
 80 \Copy &70 to IntA
 90 LDX #&70
100 JSR lodi0
110
120 \Stack IntA
130 JSR pushi
140
150 \Copy &74 to IntA
160 LDX #&74
170 JSR lodi0
180
190 \Multiply IntA by stack
200 LDA #0:STA &27
210 JSR muli
220
230 \Copy IntA to &80
240 LDX #&80
250 JSR stori0
260
270 \Copy &30-&40 to &84
280 LDX #&30:JSR lodi0
290 LDX #&84:JSR stori0
300 RTS
310 ]
320 INPUT 'Enter number1:'n1%
330 INPUT 'Enter number2:'n2%
340 !&70=n1%
350 !&74=n2%
360 CALL &900
370 PRINT 'Result=';!&80
380 PRINT 'ABS(Result)=';!&84
```

Program V

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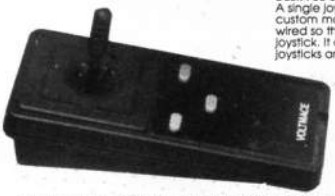

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Every aspect of machine-code programming is covered in this book in a friendly, readable style, and there's also a comprehensive index. If you want to get more out of your micro, but thought machine code was indecipherable, this is the book for you. *Save £3 off the recommended retail price.*

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75

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WHAT YOU HAVE TO DO

Below are four questions about famous and infamous "cheaters". All you have to do is tell us who you think is the cheater. Photocopy or cut out the entry form and ensure that it arrives here no later than 30 November. The winners will be the first correct entries pulled from the sack. **Only one entry per household please.**

QUESTIONS

1 Which talented" football player ended England's chances in the last World Cup with a handy cheat?
a. Mandarin b. Madonna c. Maradonna

2 Cheating with the tax return was this jockey's downfall. Who is he?
a. Lester Piggott b. Willie Carson c. Pat Eddery

3 Directors of which brewery tried to syphon off more shares than they could chew?
a. Castlemaine XXXX b. Guinness c. Mansfield

4 Which of the following Wimbledon "racketeers" is NOT famous for trying to cheat?
a. John McEnroe b. Bjorn B. c. Ilia Nastasie

ENTRY FORM

1 ☐ 2 ☐ 3 ☐ 4 ☐

Name.....

Address.....

.....

.....Postcode.....

Do you have a disc drive yes/no* (*delete as applicable)

Now send to Cheat Competition, Electron User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP

Wasp Nest
Yellow Killer Bird
Robots Approaching a Transporter
Abandoned Urn
Complex Catacomb
Underground Fire
This map shows just a small part of the World of Exile.

EXILE is an even more enjoyable game to play than ELITE or ZARCH.
... David Braben (co - author of Elite, author of Zarch)

PRIZE COMPETITION
Can You Become Exile World Champion ?

EXILE

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Have you the skill and cunning to conquer the evil world of the exile? Are you of elite status? If you take up the challenge, you will have to carefully pick your way through the massive cave system, solving complex puzzles along the way and ruthlessly destroying the alien creatures, until finally you face the evil one himself.

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- The Exile game programs, including an enhanced version which will run on the BBC Master series and BBC Micros with sideways RAM.
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- An Instruction Manual.

The game was designed and written by Peter Irvin and Jeremy Smith.

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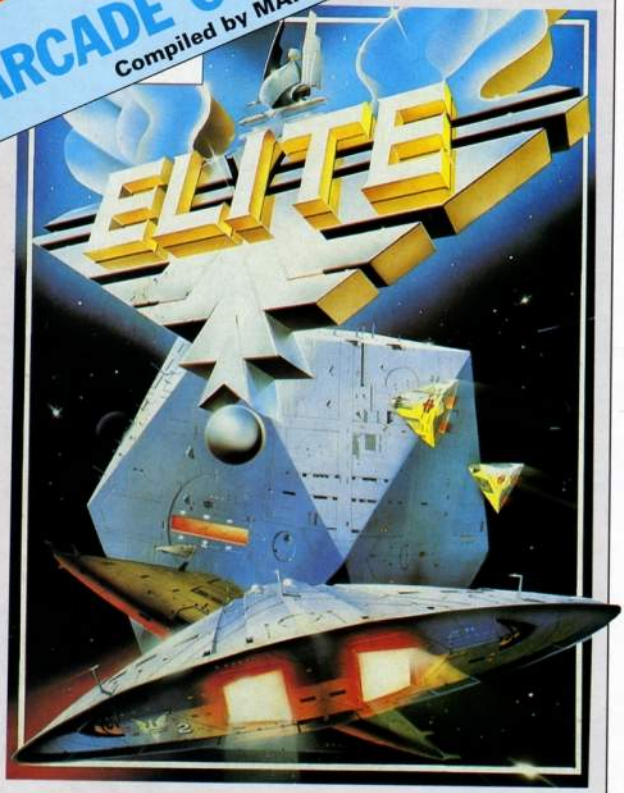
electron user ARCADE CORNER

Compiled by MARTIN REED



Customised Commander

This month's column is devoted to a single listing of a superb cheat for that classic game Elite. This program enables you to either load and modify an existing commander saved to tape, or to create an entirely new one from scratch.

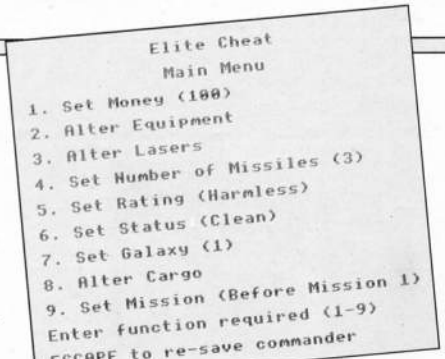
Have you ever wished your Cobra Mk II had fuel scoops, beam lasers all round, a docking computer and so on, but you haven't been able to afford them? Well now, thanks to this cheat, you can create your own ship and add whatever extras, weapons and go-faster add-ons you want. And you can give your bank balance a healthy boost too.

To use it just enter and save the listing. Then run it and create your new fully equipped Cobra Mk II by selecting items from the menus, and finally press Escape to save the commander. Load Elite as normal and select the Load New Commander option and load the one you just created.

Share your hints, tips, pokes and cheats with fellow *Electron User* arcade addicts – but please ensure they are all your own work. Send them to:

Arcade Corner,
Electron User,
Adlington Park,
Adlington,
Macclesfield,
SK10 4NP

```
  10 REM Elite Cheat
  20 REM By Stuart Menefy
  30 REM (c) Electron User
  40 *TAPE
  50 MODE 6:VDU19,0,4;0;
  60 PROC_screen
  70 PROC_init
  80 PROC_assemble
  90 PROC_load
 100 ON ERROR GOTO 1670
 110 REPEAT
 120 ON FN_MENU(1) GOSUB 820,890,1080
1100,1160,1190,1220,1370,1610
 130 UNTIL FALSE
 140 DEF PROC_screen
 150 PRINTTAB(15,0)"Elite Cheat"
 160 VDU 28,0,24,39,2
 170 ENDPROC
 180 DEF PROC_init
 190 @%=0
 200 *FX4 1
 210 DIM memory% 40,file% &100,check%
100
 220 DIM entries%(8),menu$(8,9),detai
ls$(8,9),laser%(6),rating%(9),status%(
3),mission%(5),cargo$(17)
 230 X%=&70:Y%=0:A%=0:file_system%=US
R(&FFDA) AND &F:REM Read which filing
system is in use
 240 REM Set file to commander Jameso
n
 250 FOR A%=0 TO &FF STEP 4:A%!file%=
0:NEXT A%
 260 !&70=1E3:file%!&B=&446E8B3:file%
?&10=&F:file%?&16=&16:file%?&33=3
 270 file%!1=&5A4AAD14:file%!5=&B7530
248
 280 lock%=FALSE
 290 REM Read in data
 300 FOR A%=1 TO 6:READ laser%(A%):NE
XT A%
 310 DATA 0,&F,&8F,&32,&97,&FF
 320 FOR A%=1 TO 9:READ rating%(A%):N
EXT A%
 330 DATA 0,8,&10,&20,&40,&80,&200,&A
00,&1900
 340 FOR A%=1 TO 3:READ status%(A%):N
EXT A%
 350 DATA 0,1,50
 360 FOR A%=1 TO 5:READ mission%(A%):
NEXT A%
 370 DATA 0,1,2,&A,&E
 380 FOR A%=1 TO 8
 390 READ entries%(A%),details$
 400 FOR B%=0 TO entries%(A%)
 410 READ menu$(A%,B%)
 420 IF details$="I" AND B% READ deta
ils$(A%,B%) ELSE IF details$="N" THEN
details$(A%,B%)="N" ELSE details$(A%,B
%)=details$
 430 NEXT B%,A%
 440 IF file_system%<>4 THEN entries%
(1)=7
 450 FOR A%=1 TO 17:READ cargo$(A%),f
ile%?(A%+&34):NEXT A%
 460 ENDPROC
 470 DATA 9,1,Main Menu,Set Money,!&7
0/10,Alter Equipment,N,Alter Lasers,N,
Set Number of Missiles,file%?&33,Set R
ating,FN_RATING,Set Status,FN_STATUS,S
et Galaxy,file%?&F+1,Alter Cargo,N,Set
 Mission,FN_MISSION
 480 DATA 9,1,Alter Equipment,Fuel,(f
ile%?&D)/10,Cargo Bay Size,(file%?&16)
-2,ECM System,FN_GOT(file%?&28),Fuel S
coops,FN_GOT(file%?&29),Escape Capsule
,FN_GOT(file%?&2E),Energy Bomb,FN_GOT(
file%?&2A),Energy Unit,FN_ENERGY
 490 DATA Docking Computer,FN_GOT(fi
le%?&2C),Galactic Hyperspace,FN_GOT(fi
le%?&2D)
 500 DATA 4,N,Energy Unit,Not Present
```




```
,Normal,Naval,Cheat
  510 DATA 6,N,Laser Type,None,Pulse,B
eam,Mining,Military,Cheat
  520 DATA 4,FN_LASER,Laser Position,F
ront,Rear,Left,Right
  530 DATA 9,N,Combat Rating,Harmless,
Mostly Harmless,Poor,Average,Above Ave
rage,Competent,Dangerous,Deadly,E L I
T E
  540 DATA 3,N,Legal Status,Clean,Offe
nder,Fugitive
  550 DATA 5,N,Mission Menu,Before Mis
sion 1,During mission 1,After mission
1,During mission 2,After mission 2
  560 DATA Food,&10,Textiles,&F,Radioa
ctives,&11,Slaves,&,Liquor/Wines,3,Lux
uries,&1C,Narcotics,&E,Computers,&,Mac
hinery,&,Alloys,&A,Firearms,&,Furs,&11
,Minerals,&3A,Gold,7,Platinum,9,Gem-St
ones,8,Alien Items,&
  570 DEF PROC_assemble
  580 FOR PASS%=0 TO 2 STEP 2
  590 P%=check%
  600 [OPT PASS%
  610 LDX #&49
  620 LDA #&49
  630 CLC
  640 .check_loop
  650 ADC file%-1,X
  660 EOR file%,X
  670 DEX
  680 BNE check_loop
  690 STA file%+&4B:EOR #&A9:STA file%
+&4A:RTS
  700 ]
  710 NEXT PASS%
  720 ENDPROC
  730 DEF PROC_load
  740 PRINTTAB(9,9)"Do you want to loa
d a"
  750 PRINTTAB(7,12)"previous commande
r";
  760 IF NOT(FN_YES_NO) ENDPROC
  770 PROC_oscli("LOAD "+FN_FILENAME+"
"+STR$~(file%))
  780 FOR A%=&0 TO 3:A%?&70=file%?(&C-A
%):NEXT A%
  790 IF ?file%=1 OR ?file%=6 OR ?file
%=&A THEN lock%=TRUE
  800 ENDPROC
  810 REM Alter Money
  820 CLS
  830 PRINTTAB(9,9)"Enter how much mon
ey"
  840 PRINTTAB(13,12)"you require."
  850 !&70=FN_INPUT(14,15,10,&CCCCCCC,
TRUE)*10
  860 FOR A%=&0 TO 3:file%?(&C-A%)=A%?&
70:NEXT A%
  870 RETURN
  880 REM Alter Equipment
  890 REPEAT
  900 ON FN_MENU(2) GOSUB 920,960,1000
,1010,1020,1030,1040,1050,1060
  910 UNTIL FALSE
  920 CLS:PRINTTAB(7,9)"Enter how much
 hyperspace"
  930 PRINTTAB(13,12)"fuel you want."
  940 file%?&D=FN_INPUT(17,15,4,25.5,T
RUE)*10
  950 RETURN
  960 CLS:PRINTTAB(10,9)"Enter cargo b
ay size"
  970 file%?&16=FN_INPUT(18,11,3,253,F
ALSE)+2
  980 RETURN
  990 REM Toggle various bytes, and it
ems of eqipment
 1000 file%?&28=NOT file%?&28:RETURN
 1010 file%?&29=NOT file%?&29:RETURN
 1020 file%?&2E=NOT file%?&2E:RETURN
 1030 file%?&2A=file%?&2A EOR &7F:RETU
RN
 1040 file%?&2B=FN_MENU(3)-1:RETURN
 1050 file%?&2C=NOT file%?&2C:RETURN
 1060 file%?&2D=NOT file%?&2D:RETURN
 1070 REM Alter Lasers
 1080 REPEAT file%?(FN_MENU(5)+&F)=las
er%(FN_MENU(4)):UNTIL FALSE
 1090 REM Number of missiles
 1100 CLS
 1110 PRINTTAB(8,9)"Enter how many mis
siles"
 1120 PRINTTAB(13,12)"you require."
 1130 file%?&33=FN_INPUT(19,15,3,255,F
ALSE)
 1140 RETURN
 1150 REM Alter combat rating
 1160 file%!&47=rating%(FN_MENU(6)) OR
 (file%!&74 AND &FFFF0000)
 1170 RETURN
 1180 REM Alter legal status
 1190 file%?&34=status%(FN_MENU(7))
 1200 RETURN
 1210 REM Set Galaxy
 1220 CLS
 1230 RESTORE 1280
 1240 PRINTTAB(10,8)"Enter Galaxy Numb
er."
 1250 file%?&F=FN_INPUT(19,11,1,8,FALS
E)-1
 1260 FOR A%=1 TO file%?&F+1:READ file
%!1,file%!5:NEXT A%
 1270 RETURN
 1280 DATA &5A4AAD14,&B753D248
 1290 DATA &B4945F60,&6FA6B490
 1300 DATA &69296F5A,&DE4D0821
 1310 DATA &D2526763,&BD9A1042
 1320 DATA &A5A45D69,&7B352084
 1330 DATA &4B496663,&F66A4009
 1340 DATA &96925F6A,&ED048012
 1350 DATA &2D25605E,&DBA90124
 1360 REM Set up Cargo
 1370 CLS
 1380 PRINTTAB(22)"Quantity Quantity"
 1390 PRINT" No.   Product   Unit as C
argo for Sale"
 1400 FOR A%=1 TO 17
 1410 PRINTTAB(1);A%;".";TAB(5);cargo$
(A%);TAB(18);FN_UNIT;TAB(24);(file%?(A
%+&16));TAB(33);(file%?(A%+&34))
 1420 NEXT
 1430 VDU &86,&9D,&81:PRINT"   ESCAPE
 to return to main menu"
 1440 REPEAT
 1450 PRINTTAB(1,20)"Enter number of p
roduct to alter"
 1460 number%=FN_INPUT(34,20,2,17,FALS
E)
 1470 PRINTTAB(1,20)"Enter quantity of
 ";cargo$(number%);SPC(13);TAB(1,21)"i
n cargo bay";SPC(19)
 1480 PRINTTAB(23,number%+1);CHR$&88;T
AB(28,number%+1)CHR$&89
 1490 file%?(number%+&16)=FN_INPUT(14,
21,3,255,FALSE)
 1500 PRINTTAB(23,number%+1);" ";(file
%?(number%+&16));"  "
 1510 IF number%=17 THEN 1560
 1520 PRINTTAB(32,number%+1);CHR$&88;T
AB(36,number%+1)CHR$&89
 1530 PRINTTAB(1,21)"for sale at plane
t"
 1540 file%?(number%+&34)=FN_INPUT(20,
21,3,255,FALSE)
 1550 PRINTTAB(32,number%+1);" ";(file
%?(number%+&34));"  "
 1560 PRINTTAB(0,20);SPC(119);
 1570 UNTIL 0
 1580 DEF FN_UNIT
 1590 IF A%<14 THEN ="t" ELSE IF A%<16
 THEN ="kg" ELSE IF A%=16 THEN ="g" EL
SE ="t"
 1600 REM Set Up Mission
 1610 ?file%=mission%(FN_MENU(8))
 1620 IF ?file%=1 THEN file%!1=&849421
90:file%!5=&6FA6B490:file%?&F=1
 1630 IF ?file%=&A THEN file%!1=&69295
407:file%!5=&DE4D0821:file%?&F=2
 1640 lock%=(?file%=1 OR ?file%=&A)
 1650 RETURN
 1660 REM Re-save file, and error cont
rol
 1670 IF INKEY(-1) OR ERR<>17 REPORT:P
RINT" at line ";ERL:GOTO 1740
 1680 IF main_menu%=FALSE THEN 110
 1690 CLS
 1700 main_menu%=FALSE
 1710 PRINTTAB(5,5)"ESCAPE to re-edit
 commander"
 1720 PRINTTAB(11,10)CHR$&8D;"Save com
mander."
 1730 CALL check%:PROC_oscli("SAVE "+F
N_FILENAME+" "+STR$~(file%)+" +100 0 0
")
 1740 *FX4
 1750 END
 1760 DEF FN_YES_NO
 1770 PRINT"? (Y/N)";CHR$&88;
 1780 REPEAT get%=GET AND &DF:UNTIL ge
t%=&59 OR get%=&4E
 1790 VDU get%
 1800 REPEAT get2%=GET AND &DF:UNTIL g
et2%=&59 OR get2%=&4E OR get2%=&D
 1810 IF get2%<>&D THEN get%=get2%:VDU
 &7F:GOTO 1790
 1820 VDU 8,8,32
 1830 =get%=&59
 1840 DEF FN_FILENAME
 1850 PRINTTAB(4,15)"Please enter file
 name ";
 1860 VDU 23,1,1;0;0;0;
 1870 input$=""
 1880 REPEAT
```

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◀ From Page 25

```
 1890 REPEAT get%=GET:UNTIL (get%>&1F
AND get%<&80) OR get%=&D
 1900 IF get%<>&7F THEN 1930
 1910 IF LEN(input$) input$=LEFT$(inpu
t$,LEN(input$)-1):VDU &7F
 1920 GOTO 1940
 1930 IF (LEN(input$)<10+(3*(file_syst
em%<4))) AND (get%<>&D) THEN input$=in
put$+CHR$(get%):VDU get%
 1940 UNTIL get%=&D AND input$<>""
 1950 VDU 23,1;0;0;0;0
 1960 IF file_system%=4 THEN PRINTTAB(
9,19)"Enter drive number :";STR$(F
N_INPUT(28,19,1,3,FALSE))+".E."+input$
 1970 =input$
 1980 DEF PROC_oscli($memory%)
 1990 PRINT
 2000 X%=memory% MOD &100
 2010 Y%=memory% DIV &100
 2020 CALL &FFF7
 2030 ENDPROC
 2040 DEF FN_MENU(number%)
 2050 VDU 23,1;0;0;0;0
 2060 CLS
 2070 PRINTTAB((39-LEN(menu$(number%,0
)))DIV 2,0)CHR$&80;menu$(number%,0)
 2080 FOR A%=1 TO entries%(number%)
 2090 PRINTTAB(3,(A%*2));CHR$129;A%;".
";CHR$134;menu$(number%,A%);
 2100 IF details$(number%,A%)<>"N" PR
INTCHR$&82;"(";EVAL(details$(number%,A
%));")"
 2110 NEXT A%
 2120 PRINTTAB(4,20)"Enter function re
quired (1-";entries%(number%);")"
 2140 PRINTTAB(4,22)"ESCAPE to ";
 2150 IF number%=1 PRINT"re-save comma
nder";:main_menu%=TRUE ELSE PRINT"retu
rn to main menu";
 2160 REPEAT get%=GET-&30:UNTIL get%>0
 AND get%<(entries%(number%)+1) AND NO
T((get%=7) AND (number%=1) AND lock%)
 2170 PRINTTAB(0,(get%*2));CHR$&88
 2180 PRINTTAB(4,21)"-->Press Return"
 2190 PRINTTAB(29,20)get%;" "
 2200 REPEAT get2%=GET:UNTIL (get2%>&3
0 AND get2%<(entries%(number%)+&31) AN
D NOT((get2%=&37) AND (number%=1) AND
lock%)) OR (get2%=&D)
 2210 IF get2%<>&D THEN PRINTTAB(0,(ge
t%*2)+1);" ";get%=get2%-&30:GOTO 2170
 2220 main_menu%=FALSE
 2230 =get%
 2240 REM FN's to display status next
to menu entry
 2250 DEF FN_STATUS
 2260 Z%=4
 2270 REPEAT Z%=Z%-1:UNTIL file%?&34>=
status%(Z%)
 2280 =menu$(7,Z%)
 2290 DEF FN_RATING
 2300 Z%=10
 2310 REPEAT Z%=Z%-1:UNTIL (file%!&47
AND &FFFF)>=rating%(Z%)
 2320 =menu$(6,Z%)
 2330 DEF FN_ENERGY
 2340 Z%=file%?&2B
 2400 IF Z%>3 THEN Z%=3
 2410 IF Z%=0 THEN ="Not Present" ELSE
 =menu$(3,Z%+1)
 2420 DEF FN_LASER
 2430 Z%=0
 2440 REPEAT Z%=Z%+1:UNTIL file%?(A%+&
F)=laser%(Z%)
 2450 =menu$(4,Z%)
 2460 DEF FN_GOT(A%)
 2470 IF A% THEN ="Present" ELSE ="Not
 Present"
 2480 DEF FN_INPUT(X%,Y%,L%,max,point%
)
 2490 LOCAL input$
 2500 VDU 23,1,1;0;0;0;
 2510 PRINTTAB(X%,Y%);SPC(L%);TAB(X%,Y
%);
 2520 input$=""
 2530 REPEAT get%=GET:UNTIL (get%>&2F
AND get%<&3A) OR (get%=&2E AND point%)
 OR (get%=&7F) OR (get%=&D) OR (get%=&
15)
 2540 IF get%=&15 THEN 2510
 2550 IF get%<>&7F THEN 2580
 2560 IF input$<>"" input$=LEFT$(input
$,LEN(input$)-1):VDU &7F
 2570 GOTO 2530
 2580 IF LEN(input$) THEN P%=INSTR(inp
ut$,".") ELSE P%=0
 2590 IF get%=&2E AND P% THEN 2530
 2600 IF P% AND (P%<LEN(input$)) AND g
et%<>&D THEN 2530
 2610 IF get%<>&D AND LEN(input$)<L% T
HEN input$=input$+CHR$(get%):VDU get%
 2620 IF get%<>&D OR input$="" THEN 253
0
 2630 IF VAL(input$)<=max VDU 23,1;0;0
;0;0;:=VAL(input$)
 2640 PRINT" Maximum possible value
is ";max;
 2650 get%=INKEY(100)
 2660 GOTO 2510
```


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ARCADE GAME CREATOR

Arcade Game Creator is a suite of programs taken from the pages of *Electron User*. It lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor for designing your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.

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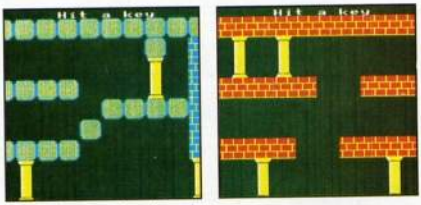

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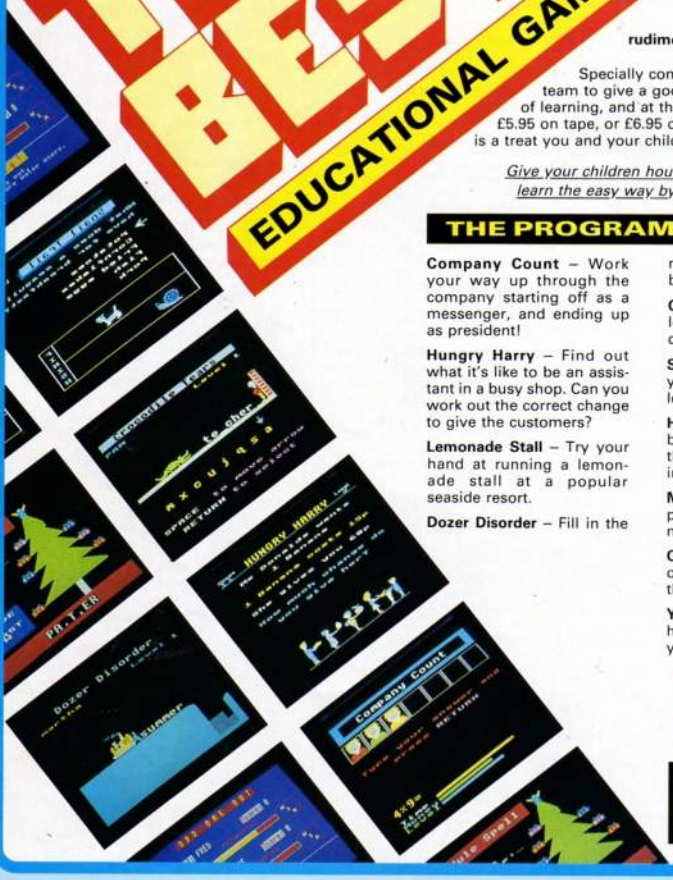

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Whizzkids

Nic Outterside reports on the history of Heyley, the adventure software creators

THERE can be few adventure software houses supplying the Electron market that have enjoyed the kind of growth that has been the fortune of Heyley during the past year. What began as two schoolboys' hobby has developed into a respected software house producing some of the most original and addictive adventures available.

Heyley is still based in the converted front bedroom of a large Victorian semi. When I visited the company recently I was ushered to this nerve centre and was surprised by the array of various micros which littered the room, perched on old kitchen tables and ancient desks.

An aura of organised chaos reigned as 20-year-old Howard Roberts and 16-year-old Tony Heap were putting the finishing touches to their next and sixth adventure, Rising Crime, a 400 location graphic epic designed for the omniscient Archimedes.

Howard's first encounter with a micro was in 1982 when his father bought him a Sinclair ZX81. Despite a lack of anything approaching computer studies at the high school he attended, and with a ZX81 plagued by annoying power surges and a wobbling ram pack, Howard soon taught himself Basic programming.

Meanwhile, a street away and unbeknown to Howard, nine-year-old Tony Heap was getting to grips with a Hewlet Packard HP85 and soon experiencing the delights of an early text adventure called Gnome. Both boys became addicted to microcomputing and were determined to buy the prince of the stable, a BBC Micro.

Tony saved furiously and by early 1983 had bought a BBC Micro with monitor and disc drive – this was shortly before the launch of the Electron. Back in Ley Hey Road, Howard, supported by his father, forked out £335 for an early BBC Micro. For two enthusiastic youngsters this simultaneously opened the door to the world of text adventuring.

A few months later Howard happened upon an early Level 9 advertisement. Subsequently he ordered a copy of Colossal Adventure.

He played this on and off for almost a year and soon ordered more Level 9 games, including his all-time favourite, Lords of Time. A contemporary article by Pete Austin in a computer journal outlined the Level 9 writing system.

Pete explained the importance of a good start game, sectionalisation of the adventure, easy movement and close puzzle relationship. Howard was hooked, and read the article again and again. It lit a spark of desire to write his own text adventure.

Tony by an equal stroke of luck had discovered that graphical stunner Twin Kingdom Valley, and was shortly making inroads into Sphinx Adventure and Castle of Riddles. For both boys these early experiences were to shape their writing method for the future.

During 1985 Howard was studying for his A levels and came across an adventure writing utility called Adventurescape. He painstakingly typed in the listing and had soon written his first 50 location adventure, Treasure Chest. It was purely an experiment and though Howard still keeps a copy of the game, it did not warrant publication.

Christmas 1985 found a heavily Level 9-influenced 18-year-old scribing a cliche ridden 254 location text epic titled The Ultimate Prize. Howard admits that Colossal Adventure and the Jackson and Livingstone Fighting Fantasy books were in the forefront of his thoughts as the first Heyley adventure took shape.

This period was also to provide the meeting with Tony Heap which was soon to be forged into an inseparable writing partnership. Howard explains: "Tony was the nearest BBC Micro owner who also had a disc drive and was keen and willing to play-test The Ultimate Prize for me".

Together with Howard's family, Tony helped iron out a number of bugs and supported a decision to market the adventure for the BBC Micro under the trading name of Heyley. Howard's father loaned them £120 which they gambled on a quarter page advertisement in a national periodical.

They were rewarded by 15 orders for their adventure, which just covered the advertising costs. More importantly, reviewers and adventurers were introduced to the name Heyley – a name which was to appear again and again in the computer press during the next two years.

Spurred by the hint of recognition, Tony also got hold of a copy of Adventurescape and wrote his first adventure, Mayhem Mansion. It was too blue to market, but helped ferment ideas which Tony would later use in the Heyley blockbuster, Dreamtime. Meanwhile Howard had left school and was facing the real world.

Between the dole, a temporary job in a museum and a BTEC college course, he was to put together Heyley's second game, Pirate's Peril. It was a vast improvement on its predecessor and featured some well developed and excruciating puzzles.

By the New Year of 1987 orders for both games were trickling in, but with the likes of Robico, Level 9 and Epic controlling the BBC Micro adventure market, success for the boys from Marple was small.

However, *Electron User* discovered that their disc-only adventures would run on Electrons fitted with Slogger's Master Ram board. Almost by accident, Heyley had now entered the Electron

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◀ *From Page 31*

market. Then with the release of Tony Heap's Dreamtime, Electron adventurers really began to take notice.

Tony had worked hard on this multi-levelled jaunt which reeked of Douglas Adams' excellent Hitchikers' Guide to the Galaxy. The game also included one of the most difficult introductions to be found in any adventure.

Reviewers heartedly applauded this latest release and warmed to the sense of humour which pervades all Heyley games. Howard and Tony explained that humour is important to them both and is refreshing in a world where most computer programmers are as dry as a dog's bone.

For instance, if an adventurer examines some sleeping pills in Pirate's Peril the game responds with "Sshh, you'll wake them up". While in Dreamtime there is a metal grate with the name Alfred inscribed upon it – Alfred the Great, get it?

But perhaps my personal favourite is the vampire with a bad heart. If you feed him a raw steak filled with collesterol he dies from a major coronary. This type of humorous injection has now become almost a Heyley hallmark.

As Tony began to learn machine code programming he brought more influence to bear on the coding of the ensuing Heyley adventures. The Taroda Scheme became a family effort, with everyone chipping in an idea or puzzle.

The whole concept of this particular game came from Tony's father during evening tea. From this sprang five pages of pencilled notes which gave grounding for the boys to sit down and plan out the whole framework for the adventure.

At this time, Howard was enduring a boring college placement where much of his time was spent staring at blank VDU screens. In such moments of daydreaming he formulated many suggestions for The Taroda Scheme. Meanwhile Tony's ideas were propagating during lessons at school. It was while studying Macbeth for his GCSE English exam that the inspiration was gained for a puzzle in Stranded. Consequently they both keep a pad and pencil with them at all times, for as Howard said "You never know when a brilliant idea might come to you".

They both also admit to cribbing some ideas from the plethora of science fiction novels they read. Harry Harrison's Stainless Steel Rat is Born had a profound effect on some of the scenarios introduced in their games.

It is certainly true to say that all of the Heyley adventures, incorporate some of the most original and tightly structured logical puzzles you will ever find.

Thanks to favourable reviews of their first four adventures Howard and Tony were seeing a part-time hobby developing into a small profitable business. However, in March 1988 they made their second successful gamble when they paid £500 to book a stand at the Manchester Electron and BBC Micro User Show.

Howard tells the story of their breakthrough into the big time. "We set up our stand with our five adventures, including our new game, Stranded!, alongside a stock of Level 9 and Robico games which we had negotiated to sell for the respective companies.

"The Friday was terrible, as we sold about three games all day and were seriously thinking of packing up and going home. However, for no apparent reason Saturday and Sunday were different as hundreds of customers flooded to our stand.

"We were really in the public eye and selling our own games alongside established Level 9 and Robico adventures had the desired knock-on effect". Orders started to flood in, and now Heyley was being mentioned in the same breath as giants like Infocom and Level 9.

The show also gave Tony and Howard the chance to establish important contacts with people like Geoff Larsen of Larsoft and Dave Hitchins of Pres. It was this contact with Dave which was to lead immediately to Pres marketing standard 32k Electron conversions of all the Heyley adventures. It was a deal that Heyley has never regretted.

What of the future? Both Howard and Tony have grown with their adventures and show a writing maturity which belies their years. They offer different skills and freely criticise each other in attempts to produce the adventure which will perhaps provide their ultimate prize.

Rising Crime is almost ready for release and should be a smash hit. Tony is currently working on his own machine code adventure writing system with a full multi-sentence parser and hopes to utilise it for a supernatural-based adventure which he intends to complete for the New Year.

Despite the time restrictions imposed by Howard's day job in technical support and Tony's impending A Level course, the ideas continue to proliferate and future adventures are promised for the Electron.

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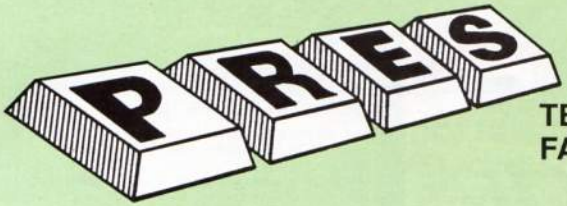

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STOP PRESS

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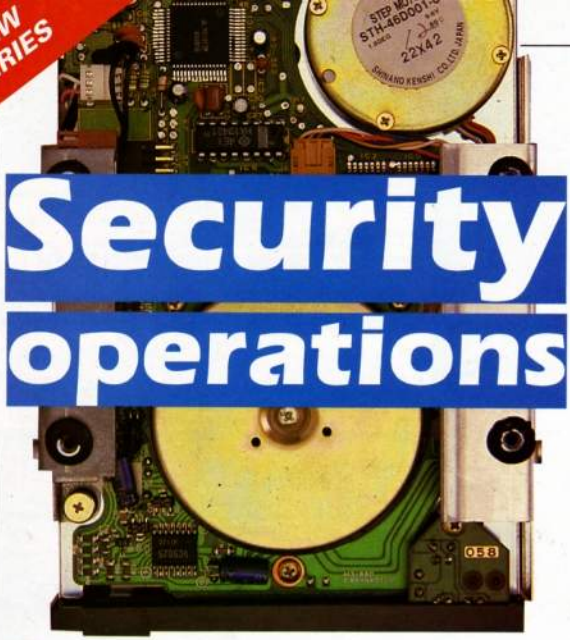

Security operations

In the first part of a new series investigating discs Roland Waddilove presents a file destroyer

THE original disc series in *Electron User* – October 1985 to July 1986 – exploring the Plus 3 was a huge success, and since then many readers have written in asking for more information on this very complex combination of hardware and software.

In this new series of articles I'll be presenting more useful information, programs and utilities to help you use the Plus 3 – and Plus 4 too – to the full.

The Electron is a powerful beast and consequently is often used in the home, or even small clubs and libraries, to store information we would rather be kept secret, such as accounts, records, salaries and diary notes.

These data files may have been created by databases like Starstore, word processors like View and so on. Fathers may not want their children to know how much is in the bank account, or programmers may wish to keep their source code away from pirates, club secretaries may store confidential records that other members should not have access to, and so on.

Whatever the source, keeping this information out of sight of unauthorised eyes can be a problem. One way is to keep the data discs hidden or under lock and key, or perhaps the software has a password system. Once the data is finished with it can be deleted from the disc. However, this last option doesn't mean the data file has been erased from the disc, quite the contrary – it is still there in its entirety.

A list of all the files stored on a disc is kept in a special place on it near the start, and this is called the directory. You can see the directory of an ADFS disc in Figure I. The information contained in this tells the disc operating system what each file is called and where to find it on the disc. Figure II shows this.

What the ADFS and DFS do when they delete a file is to simply remove the entry from the list of files in the directory. It's as if it never existed, so the space on the disc that it used to occupy is free once more.

Clever hackers can either reconstruct the directory and recover the file, or alternatively, examine the sectors of the disc with a disc editor and read the contents of the file – see Figure III. The section of disc that the file occupied can be loaded into memory too, and that means it can easily be copied on to another disc and freely distributed.

The bottom line is that even if you delete a file from your disc it still isn't safe from prying eyes.

What we need to do is totally destroy the contents of the file before deleting it, then if it is recovered or examined it can't be read. And that's what the utility in Program I does:

```
10 REM ADFS & DFS File Kill Utility
20 INPUT "Filename:"name$
30 channel=OPENUP name$
40 length=EXT#channel
50 FOR byte=1 TO length
60 BPUT#channel,ASC"*"
70 NEXT
80 CLOSE#channel
90 OSCLI "DELETE "+name$
```

Program I

Note that it works with both the DFS – used in the Plus 4 – and ADFS – used in the Plus 3 – filing systems as it doesn't use any filing system-specific calls. Line 20 asks for the file to delete, and stores it in *name$*. Line 30 opens the file for reading and writing, while the next one finds its length.

A BPUT command embedded within a FOR ... NEXT loop then overwrites the whole contents of the file with asterisks. Line 80 closes the file, and the final line deletes it. If anyone was to now examine the disc all they would see is asterisks where the file used to be.

It's a bit inconvenient having to load a separate program every time we wish to destroy and delete a file on disc, so here is an identical version which has been programmed into a function key:

```
*KEY1 I."File:"n$:c=OPENUPn$:L=EXT#c:
F.b=1 TO L:BP.#c,42:N.:CLO.#c:OS."DEL
. "+n$|M
```

All you need to do is hit Func+1 to destroy a file. To cut the program down in size so that it easily fits into a function key definition I have used single letter variables and abbreviations for all the Basic key words.

This is very useful when in Basic, or for general housekeeping tasks in direct mode, but this still isn't perfect. Suppose you are in View, or Viewsheet, and wish to destroy a file. In this case it's very inconvenient to have to exit to Basic – losing all your work – enter or load the function key definition and run it.

A star command would be better, then we could use it from Basic, View, Viewsheet and so on, without losing the current contents of memory. There are several ways of implementing this, but the main core of the code is essentially the same and is shown in Program II.

Enter the listing, save it and run it. The machine code is stored at &900, so you can now clear memory, or load another program without wiping it out. To use it enter:

```
CALL &900
```

You'll be prompted with a question mark and a flashing cursor. Simply enter the file to destroy, press Return and the job is done. You can save the machine code to disc with the name FKILL, but don't use DESTROY, as there's a built in disc command with the same name and the poor Electron will probably get confused and may use the wrong one. Run the program and enter:

```
*SAVE FKILL 900 972
```

Once this has been done it can be called up with the more convenient star command *FKILL, and used in exactly the same manner as before. The machine code is very simple – as machine code programs go, that is – and uses some very important routines which we'll see quite a lot of in this series. They are all defined in lines 50 to 90.

The first action the utility performs is to display the query prompt. The Ascii value is loaded into the accumulator and *oswrch* is called to print it. The second action is to get the filename using *osword* zero – the machine code equivalent of Basic's INPUT command.

For this a control block is needed. The first word is the address at which to store the input. The next byte sets the maximum number of characters entered, and the following two bytes hold the minimum and maximum Ascii values

allowed. You can see this block in lines 660 to 710.

The file length is found using *osfile* five. This is another operating system call that uses a control block – set up in lines 610 to 640.

Although it's 18 bytes long all we need to do is store the address of the filename in the first word, load the accumulator with five and call *osfile* with the X and Y registers pointing to the start of the block. The length is returned in bytes 10 and 11 of the block.

The file is opened for reading and writing – lines 290 to 330 – using *osfind*. Basic's OPENUP function is emulated by loading the A register with &80 and calling *osfind* with the X and Y registers pointing to the filename. The channel number is returned in A.

Lines 360 to 480 overwrite the contents of the file with asterisks using the machine code equivalent of Basic's BPUT – *osbput*. This simply writes out the contents of the A register (the channel number must be held in the Y register).

The penultimate operation is to close the file, another *osfind* function, this time with the accumulator set to zero and the channel number in Y.

Finally the file is deleted using *osfile* six. The A register is set to six, the X and Y registers point to the control block and the first word holds the address of the filename.

● *I've covered quite a lot of ground in this first article, but don't worry, you've got a whole month to assimilate it till the next one when I'll present some more interesting programs and utilities.*

```
 10 REM File Destroyer
 20 REM By R.A.Waddilove
 30 REM (c) Electron User
 40 FOR pass=0 TO 2 STEP 2
 50 oswrch=&FFEE
 60 osword=&FFF1
 70 osfile=&FFDD
 80 osbput=&FFD4
 90 osfind=&FFCE
100 P%=&900
110 [ OPT pass
120
130 \Print prompt
140 LDA #ASC"?"
150 JSR oswrch
160
170 \Input the filename
180 LDA #0
190 LDX #iblock MOD 256
200 LDY #iblock DIV 256
210 JSR osword
220
230 \Get the file length
240 LDA #5
250 LDX #fblock MOD 256
260 LDY #fblock DIV 256
270 JSR osfile
280
290 \Open the file
300 LDA #&80
310 LDX #name MOD 256
320 LDY #name DIV 256
330 JSR osfind
340 TAY
350
360 \Destroy the contents
370 .loop
380 LDA #ASC"*"
390 JSR osbput
400 SEC
410 LDA fblock+10
420 SBC #1
430 STA fblock+10
440 LDA fblock+11
450 SBC #0
460 STA fblock+11
470 ORA fblock+10
480 BNE loop
490
500 \Close the file
510 LDA #0
520 JSR osfind
530
540 \Delete the file
550 LDA #6
560 LDX #fblock MOD 256
570 LDY #fblock DIV 256
580 JSR osfile
590 RTS
600
610 \File control block
620 .fblock
630 EQUW name
640 EQUS STRING$(16,CHR$0)
650
660 \Osword control block
670 .iblock
680 EQUW name
690 EQUB 16
700 EQUB 33
710 EQUB 126
720
730 \Filename
740 .name
750 EQUS STRING$(16,"*")
760 ]
770 NEXT
780 PRINT"Start=&900"
790 PRINT" End=";~P%
```

Program II

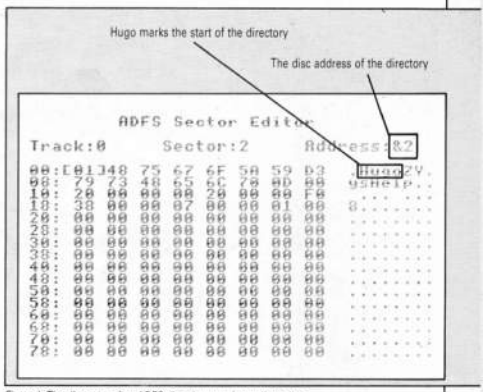

Figure I: The directory of an ADFS disc shown using a disc editor

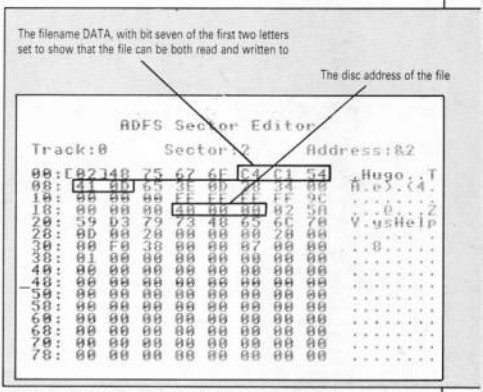

Figure II: The directory of an ADFS disc after saving a file called DATA

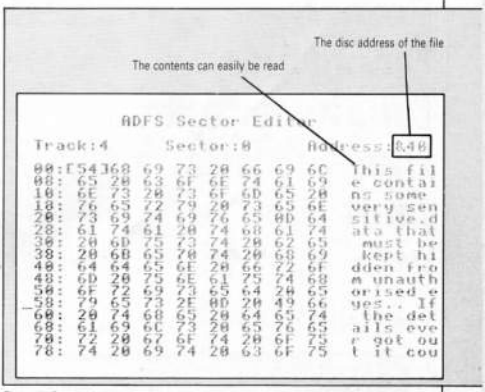

Figure III: Examining the disc after deleting the file shows the contents to be intact

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If you're studying French for GCSE or A-level this year then French on the Run is just what you need. It is specially designed to teach you the basic points of French grammar and to help you practise interactive discussion. It begins at GCSE standard, and by the time you get to the end you will be using A-level French!

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At the specially reduced price of £4.95 on tape, or £5.95 on disc, French on the Run is the ideal inexpensive way for you to brush up your French!

For teachers: *French on the Run uses multi-choice questions with randomised distractors, all carefully chosen to illustrate linguistic points or points concerning things French. The program is meant for individual assessment, but can be used just as effectively for classroom work. A sealed envelope contains details of how the secret passwords are created.*

Place your order TODAY, using the form on Page 45

MICRO MESSAGES

Go slow at Tower bridge

WHILE at school reading a back issue of The Micro User, *either November or December 1985, I came across the game Tower Bridge. I took the magazine home and typed it in. To my disappointment it would not work properly because the little man would not climb up the side of the tower. I have typed this program in twice and it has the same effect. Could you tell me why it won't run on my Electron as it works perfectly on my school's BBC Micro?*

Please could you print the Pinball program in your magazine which was mentioned by W. Trapmore in the September 1988 Micro Messages? I think Arcade Corner is excellent, but will you print a map of Citadel, as it is very hard? I think your magazine is excellent value for money, keep up the good work. – **Gary Wilson, Burton Agnes, East Yorkshire.**

● Tower Bridge was published in the December 1983 issue of *The Micro User* and runs perfectly on the Electron, though it is very slow. It is best played with a Slogger Turbo. If it runs on the school's BBC Micro you must have typed it in correctly so we can't understand why it won't run on the Electron. We're stumped.

Pinball was published in the February 1988 issue of *The Micro User*, and with our modifications printed in last month's Micro Messages will run on the Electron. We won't be publishing it again in *Electron User*.

Silent Electron

IN the November 1985 issue of Electron User *there is an advert on page 47 about a speech synthesiser called the Voxbox. I wrote to the company who manufacture them in May 1988, but they never replied. So please could you tell me where I could buy a speech synthesiser?*

Also in Electron User *February 1987, the game Tommy and the Toadstools works fine except for one small problem. When Tommy walks left the top half of his body disappears. Please tell me what I have done wrong.* – **M.G. Page, Sleaford, Lincs.**

● The company which produced the Voxbox is no longer trading and it isn't available any more. Try M&S Associates, 40 Meyrick Drive, Newbury, Berkshire RG14 6SX. Tel: 0635 45774.

Tommy and the Toadstools is correct, so you must have made a typing error somewhere. Please check every line carefully against the printed listing.

Transferring tape to rom

AFTER buying a Plus 1 for my Electron, to my horror I found there weren't many rom cartridges for it. As I have lots of commercial software on cassette I would like to know if there is any way of copying my tapes onto rom or eprom?

I think the magazine is great, especially Pendragon and the software reviews. – **Jacqueline Mcfadden, Wakefield.**

● It is possible to put tape software on to eproms, but it isn't worth the expense, time or effort involved.

More from your Brother

I HAVE recently bought a Brother HR5 printer, and am generally very pleased with it. It is very useful for program listings and word processing, and is good value for around £60. However, I have a couple of questions about its use.

How do you get all of the different type faces? How do you use the highlights in Acornsoft's View on the HR5? Can it do screen dumps, and if so, which ones? – **W.M Spillett, Immingham.**

● To make the printer change to a different type style you need to send it one or more control codes. For instance, the code 14 will tell the printer to output text in double width style. You would enter this like:

```
VDU 2,1,14,3
```

The first number tells the Electron to copy all output intended for the screen to the printer as well. The second number tells the Electron to send the next code to the printer only. The third number is the control code, and the last number disables output to the printer. To use the highlight commands in View you need a printer driver. Acornsoft produces one, and we published a DIY printer driver in the August 1987 issue of *Electron User*.

You can do screen dumps on the HR5 quite easily. Here's a short procedure that will do the job:

```
1000 DEF PROCdump
1010 VDU 2,1,27,1,65,1,4,13
1020 FOR Y%=1023 TO 31 STEP -32
1030 VDU 1,9,1,27,1,75,1,64,1,1
1040 FOR X%=0 TO 1276 STEP 4
1050 A%=0:B%=128
1060 FOR C%=0 TO 28 STEP 4
1070 IF POINT(X%,Y%-C%) A%=A%+B%
1080 B%=B% DIV 2
1090 NEXT
1100 VDU 1,A%
1110 NEXT
1120 VDU 1,10
1130 NEXT
1140 VDU 3
1150 ENDPROC
```

When you want to dump the screen call PROCdump from within your program.

Square up to the problem

THERE was a slight fault with the Solitaire program in the August 1988 issue of your excellent magazine – there was no white square to pinpoint the cursor. Although the game will still run, it was a little irritating.

The fault is in line 740, the last number on this line should be 255 not 225. I hope you will inform your readers. – **R. Johnson, Marple.**

● It is 225 in our master copy of the game, and this correctly prints the white square. You must have made an error elsewhere in the listing, perhaps in line 170, and your modification cured it.

Missing page turns up

THANKS for a very good magazine. I was, however, annoyed that the June 1988 memory map of page two only went up to &2BD. Could you explain this? If it is just my copy could you please print the missing part – &2BD to &2FF.

*In the November 1987 issue there was a cheat for infinite lives in Blagger. It does not say whether you have to load the first two parts before starting the *LOADs, and when I call &1900 nothing happens. Please could you tell me what is wrong?*

I like Micro Messages, Pete Bibby's articles and

Turn to Page 40 ►

◀ From Page 39

the Memory Map. I would like to see more utilities and possibly a hints and tips section. How about a (possibly optional) tape, bought with the magazine, with all the listings on it? Like most, I find typing in listings a very unpleasant and tedious task.

*Also a complete summary of osbyte/*FX calls including undocumented ones such as *FX178 and miscellaneous VDU codes would be very useful.*

Finally, is middle C 52 or 53 in the Electron sound command? – **Jonathan Bell, Edinburgh.**

● We're not sure what happened to the last part of page two. Here it is now:

Address	Use
&2BE	Last ADC channel converted.
&2BF-&2C8	Event enable flags.
&2C9	Soft key expansion pointer.
&2CA	First auto-repeat count.
&2CB-&2CD	Keyboard workspace.
&2CE	Zero when envelope being processed.
&2CF-&2D7	Buffer busy flags.
&2D8-&2E0	Buffer start indices.
&2E1-&2E9	Buffer end indices.
&2EA/&2EB	Block size of current open cassette block.
&2EC	Block flag of current open cassette block.
&2ED	Last character of current open cassette block.
&2EE-&2FF	Osfile control blocks.

To use the Blagger cheat, *LOAD parts two to seven before entering the pokes. Then call &1900 to run the game.

There is a tape of all the listings in the magazine and you can get it by filling in the order form on Page 45. Middle C is 52.

Nothing but garbage

FOR the past year or so I have used my Electron to amuse and instruct my grandchildren. Growing more ambitious, and realising that my typewriter had a Centronics parallel input. I bought a Plus 1 and Mini Office program.

Unfortunately, the resulting output is garbage, and when I tried a View cartridge nothing was printed at all. Apart from the printer output – or lack of it – everything seemed correct, and when I tried a friend's Electron with my Plus 1 the system worked perfectly.

So it seems that the computer is at fault, and I now have to decide between presenting it to Military Intelligence as the latest in coding machines, or having a go at repairing it myself.

If I am right in assuming the problem is related to the baud rate, could this be put right by replacing one of the circuits? If so, I would be grateful if you could advise me whether there is a manual which will indicate which one is the villain of the peace. – **J.T. Holland, Bibury, Cirencester.**

● We can't trace a circuit diagram of the Plus 1, but there is one of the Electron in the Electron Advanced User Guide. Also the book reviewed this month – Servicing Personal Computers – should help.

AP3 makes a friend

THIS letter is partly written in thanks for recommending to me the Advanced Plus 3 disc drive in the November 1987 issue. I now have an Electron, Plus 1, Advanced Plus 3, and a Brother HR5. The AP3 is an excellent piece of hardware from the genius at Pres, and no wonder they are selling well – the right machine at the right price.

I must also commend the service at Pres. I telephoned them, and received a quick answer – no answerphone. I placed my order within minutes, and received my AP3 within five days. Now that's what I call service.

Your magazine continues to be of high standard – and an Arcade Corner Quest special would be appreciated. – **Zachary Tullett, Bognor Regis.**

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

The key to lock-ups

I HAVE had my Electron for four years and have been reading your magazine for over three. I think that both are excellent. Just recently I cured a fault which appeared on my Electron, and I thought the solution may be useful for other readers.

The Electron started to lock up – the display would suddenly go haywire and the keyboard cease to operate. Even Ctrl+Break did nothing. Other symptoms were that the motor relay closed, starting the cassette player, and the Caps Lk LED went out. Switching off the power did not always cure these effects, showing that the problem was with the hardware.

I was then thinking of either a large repair bill or dumping the Electron, neither of which I wanted, so I decided to have a look myself. The circuit diagram in the Advanced User Guide showed that all the parts affected were controlled by the ULA (IC1).

In my Electron this chip is held in a square carrier at the PSU end of the board. I undid the clip on the top of the carrier and removed the metal cover. As I thought the problem could be a dirty contact, I gently slid the chip back and forth several times and then re-assembled the unit.

Since then my Electron has performed beautifully, so if you have these symptoms and your ULA is in a chip carrier then try this. It may save you a repair bill.

May your magazine continue to prosper. – **Keith Watts, Watford.**

No joy

I OWN an Acorn Electron fitted with a Plus 1 and a pair of Acorn ANH01 joysticks. They don't seem to work properly with my Electron. Please could you tell me if I have to use any codes, and if so, could you please tell me which?

I am also thinking of getting some cartridge software, but I don't know what is available and who specialises in making them. I would be grateful if you could help. – **Simon Butterfield, Barry, South Glamorgan.**

● Not all games work with joysticks, and generally speaking, the older the software the less likely it is to support them. There is probably nothing wrong with your joysticks, it's just that the game doesn't use them. However, the joystick utility in the November 1987 issue of *Electron User* may help.

...and the status quo

I HAVE to say I strongly disagree with Ben Rees's letter in the September 1988 issue of Electron User. *I like learning about my Electron by reading your magazine and I don't want to read page after page of games reviews and cheats that make games so easy they become boring.*

If anyone wants more of the games and fewer technical articles why don't they buy a different publication? I think your magazine is of excellent quality and should not change. – **A.C. Davidson, Bishop Auckland, Co. Durham.**

More light on dumps

I WOULD like to suggest that you amplify the articles by Julia Foster entitled Exploring Printers, published in the January, February and March 1988 issues of Electron User.

I have been using my Electron for many years, and have recently bought an Amstrad DMP3160 printer in order to be able to print screen dumps with shading for colour. In spite of great efforts I have not succeeded. I can get into bit-image mode as described in the above articles, but cannot get a screen dump.

The subject is referred to in Micro Messages of the September 1988 issue under OK for colour. Can you offer any advice? Would it be possible to amplify the last few paragraphs of Julia Foster's article? – **Walter Thurner, Macclesfield.**

● The Amstrad DMP3160 printer is not a colour

printer so the OK for colour letter doesn't apply to your printer. You can use the screen dump given in reply to W.M Spillett's letter providing you alter the 4 in line 1010 to 8.

You'll find six screen dumps in the June 1986 issue of *Electron User*, along with full explanations. We can't really cover the subject fully enough here

Keep that balanced view

I STARTED buying your magazine in April 1987 having bought the Electron as a Christmas bargain package for the family. I am not particularly interested in games, but my chidren are, although not on a regular basis. I am more interested in product reviews and the not too technical articles.

I realise that there are many different interests revolving around the Electron and hope that you keep the magazine as it is, as I think it is well balanced. If it became overwhelmed by software reviews for the game addicts I think you might lose a lot of your older readers. – **J. Jones, Fordham, Essex.**

● We hope you like the new facelift, but the overall balance of articles remains the same.

Kicked into touch

HELP! I am a Soccer Boss in despair. Recently I bought Alternative Software's Soccer Boss and after many attempts I have still not managed to get out of the Fourth Division. My highest position is 12th, and I have only managed to get to the sixth round of the FA Cup.

Each season seems to end up the same. Even when I have much higher ratings I still manage to lose the game 2-0 or 3-0. Please can you help? Is there any special strategy to be used? When playing Football Manager I can win the League Title and FA Cup almost every time and only lose one or two matches.

It was said in the software pages of your magazine that this game would never be surpassed. What am I doing wrong? – **Edward Prosser, Tunbury Wells.**

● Have any readers got some management tips for Edward?

Suggestions wanted

I HAVE put a T2P3 Rom from Slogger into Pres' Advanced Rom Adapter Mk.II and it does not copy all the software it claims to. Should I be putting it somewhere else?

Also, you could possibly write some brief reviews for software which you cannot fit into your reviews pages similar to the comments in the Gallup Chart, but with some details on speed, keyboard response (if applicable) and so on, as well as your normal marks out of 10 for sound, graphics and playability? I think a Best Buys section to accompany this might be a good idea.

Finally, how do you read the keyboard from machine code? Is it possible to read it like a negative INKEY would? – **Andrew Tomlinson, Morpeth, Northumberland.**

● Slogger's T2P3 won't transfer all software to disc, and usually has more success with older games. It may be that you have tried to use it with a later version of the software it claims to work with. It is fine in the Pres Advanced Rom Adaptor.

You can quite easily read the keyboard from machine code using negative INKEY. Call osbyte (&FFF4) with the negative value of the key in the X and Y registers and A set to 129. On return Y will be either &FF (true) or &00 (false) indicating whether the key is being pressed.

We'll bear in mind your suggestion about the brief reviews.

Bugs and viruses

A COUPLE of months ago I watched an extremely interesting television program concerning an unusual breed of virus that infected computers. Apparently the computer virus was a clever program that caused the micro to do things – like crashing.

It was stored on a disc and automatically entered the computer's memory when the disc was accessed. Once there it not only affected the computer, but also transferred itself on to any other disc used on the infected computer.

For interest, I tried to recreate a similar program for my Electron. However, not being too brilliant at machine code, I failed miserably. So I am writing to ask whether you could produce such a program? – **Ian Wright, Cambridge.**

● It is not possible to write a virus type of program for the Electron. Computers like the IBM PC and clones, and the Atari ST automatically load a program off disc when they are switched on. In fact the PC won't work unless there is a disc in the drive.

This boot program can be replaced by the virus, or it can be tagged on to the end. It then installs itself in memory. Whenever you access a new disc it copies itself on to it.

Phloopy has flipped

I RECENTLY saw an article in a back copy of Electron User *– January 1985 – regarding the Phloopy tape-based data storage system from Phi Mag Systems. As I have only recently seen this article I would be grateful if you could tell me if this system is still on the market, and if possible supply the address of Phi Mag Systems.*

Also a few months ago I saw a letter from a reader in another old issue, which I am now unable to get hold of again. The letter that interested me was about using the printer port of the micro to control relays and so on.

In the article a number of pokes were listed in order to switch on the various data lines. I would be grateful if you could supply me with more information about this. – **Simon Roberts, Stockport.**

● Phi Mag Systems are no longer trading and the Phloopy isn't available any more. Write to &FC71 to output information on the data lines, and read &FC72 to input data from them.

Producing harmonics

IT feels like I am the only person in Norway to have an Electron. However, I find your magazine is a very good friend. I am quite happy with my micro except for one thing, the poor sound.

I have used the envelope command to produce some harmonics. Try the following program:

```
10 ENV. 1,1,0,16,-16,1,1,1,0,0,0,0,0,0
20 ENV. 2,1,0,12,-12,7,7,7,0,0,0,0,0,0
30 SOUND 1,1,52,10
40 SOUND 1,2,60,10
50 SOUND 1,2,68,10
60 SOUND 1,1,72,10
70 SOUND 1,1,80,10
80 SOUND 1,2,88,10
90 SOUND 1,2,96,10
100 SOUND 1,1,100,10
```

By changing the third and fourth parameters in the envelope you have the harmonic you want. I have made some nice music in this way.

Being also an assembler fan, I have replaced the old 6502 with a 65C02 and it works beautifully. Is there an assembler for this to replace the old? Also, is there a Bridge program for the Electron? – **Ceir Dahl, Norway.**

● We haven't heard of an assembler for the Electron that can handle the extra opcodes. However, they can be assembled by hand using EQUB. The following table shows the opcodes to use.

Mnemonic	Opcode
BBR zero page,bit n	&(n)F
BBS zero page,bit n	&(8+n)F
BRA	&80
CLR zero page	&64
CLR zero page,X	&74
CLR absolute	&9C
CLR absolute,X	&9E
DEA	&3A
INA	&1A
PHA	&DA
PHY	&5A
PLX	&FA
PLY	&7A
STZ zero page	&64
STZ zero page,X	&74
STZ absolute	&9C
STZ absolute,X	&9E
TRB zero page	&14
TRB absolute	&1C
TSB zero page	&04
TSB absolute	&0C

Colossus 4.0 Bridge has just been released by CDS software and costs £11.99.

.....The Impact Games Club.....The Impact Games Club.....The Impact Games Club.....The Impact Games Club.....

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- Bug Eyes 2.....(Map)
- Mysteron.....(Solution)
- The Lost Crystal.....(Solution + maps)
- Imogen.....(Solution + 16 maps)
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- Citadel.....(Solution + map)
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- Elixir.....(Solution + maps)
- Paperboy.....(Helpsheet)
- Twin Kingdom Valley.....(Solution + map)
- Omega Orb.....(Solution + map)
- Elite.....(Helpsheet)
- Tarzan.....(Solution + map)
- Stranded.....(Solution)
- Codename : Droid.....(Solution + map)
- Thunderstruck.....(Solution + map)
- Suds.....(Solution + map)
- Philosopher's Quest.....(Solution + map)
- Rick Hanson.....(Solution)
- Thunderstruck 2.....(Solution + map)
- Kourtyard.....(Helpsheet + map)
- Dunjunz.....(Helpsheet + 25 maps)
- Gridrunner.....(Solution + map)
- Palace of Magic.....(Solution + map)
- Impact.....(Helpsheets + passwords)
- Icarus.....(Helpsheet + maps)
- Sphinx Adventure.....(Solution + map)
- Anarchy Zone.....(Helpsheet + passwords)
- Repton 2.....(Helpsheet + 18 maps)
- Bonecruncher.....(Passwords + 10 maps)
- Skirmish.....(Helpsheet)
- Cholo.....(Solution)
- Quest for Freedom.....(Solution + map)
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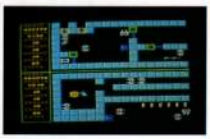

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Go-Pig, Dozer Disorder, squashed character sets, sprite print routines.

May 1988:
Lion's Lair, Keyboard Gremlins, French to English translator, machine code map display routines.

June 1988:
Fibonacci Nim, Bomb Alert, Procedure and function lister, car route database, scrolling map routines.

July 1988:
Knockout Whist, Randall Rabbit, Tilley the Train, Tennis. machine code score routines, Easy Reader.

August 1988:
Fox and Geese, plus Solitair board games, Mini Prolog, machine code disassembler.

September 1988:
Crypton, Fire, Oxo, Lister, sprite utilities, Listif.

October 1988:
Aussie Suds Part 1, Pistol Shooting, Spencer Spider, Gobbler, rom routines.

TO ORDER PLEASE USE THE FORM ON PAGE 45

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```
LOUR@:PRINTTAB(9,2);level" ":CALLpscor
:PROClives
  290 FORN%=&6420TO&781FSTEP&140:!N%=&
F0F0F0F0:N%!4=!N%:NEXT:FORN%=&7820TO&7
80FSTEP&140:!N%=&F0F0F0F0:N%!4=!N%:NEXT
  300 !fuelc=&6420:?fuelf=0:?fuelt=4:E
NDPROC
  310 DEFPROClives:COLOUR128:PRINTTAB(
13,1)"    TAB(13,2)"    ":IFlives
>1FORN%=1TOlives-1:!scr=&59F8+24*N%:!d
at=&960:CALLprint:NEXT:ENDPROC ELSEEND
PROC
  320 DEFPROCwindow(left,bottom,right,
top,rim,centre):L%=left*64:R%=right*64
+64:T%=1023-top*32:B%=992-bottom*32
  330 GCOL0,128:VDU24,L%-24;B%-24;R%-1
6;T%-16;:CLG:GCOL0,128+rim:VDU24,L%-8;
B%-8;R%;T%+8;:CLG
  340 COLOUR128+centre:VDU28,left,bott
om,right,top,12:ENDPROC
  350 DEFPROCmaze:RESTORE440:M%=0:FORY
%=0TO31:READA$:FORX%=0TO3:A%=EVAL("&"+
LEFT$(A$,2)):FORN%=0TO7:A%=A%*2:IFA%>2
55M%?maze=&A0 ELSEM%?maze=0
  360 M%=M%+1:A%=A%AND&FF:NEXT:A$=RIGH
T$(A$,LENA$-2):NEXT,
  370 RESTORE490:FORN%=0TO60:READX%,Y%
:Rocks%(N%)=X%+32*Y%:NEXT:FORN%=0TO60:
RX=RND(61)-1:TX=Rocks%(N%):Rocks%(N%)=
Rocks%(RX):Rocks%(RX)=TX:NEXT
  380 Lim%=level*5+5:IFLim%>60Lim%=60
  390 FORN%=0TOLim%:maze?Rocks%(N%)=&C
0:NEXT:PROCenemies
  400 FORN%=1TOlevel*2+8:REPEAT:FX=RND
(1024)-1:UNTILFX?maze=0:FX?maze=&E0:NE
XT:?flags=N%-1:?flgdec=N%MOD10+16*(N%D
IV10):ENDPROC
  410 DEFPROCenemies:RESTORE520:?enms=
level DIV2:IF?enms>7 ?enms=7
  420 FORN%=0TO?enms:READenmx?N%,enmy?
N%:A%=enmx?N%+enmy?N%*32:A%?maze=&60:N
EXT:ENDPROC
  430 REM Maze Data
  440 DATA88041100,AAA4D154,AAA65554,A
AA04554,2A20F054,6AFFC104,0A010D54,78F
C4554
  450 DATA0005555 4,7D554554,05555400,0
5514 70F,7D555400,01554400,FB117400,81F
54400
  460 DATABC045C00,05FFD000,75010400,2
52104 00,AD3FFC00,880A2400,DBE007FF,003
48420
  470 DATA5787E5AE,50FC7C80,5E0D06BE,4
0E10280,5E0878BE,50FA0280,578A06AE,000
8FE20
  480 REM Rocks Data
  490 DATA2,0,12,0,31,0,21,1,11,2,26,2
,30,2,14,3,24,3,8,4,12,4,31,4,24,6,30,
6,28,7,20,8,26,8,31,8,1,10,18,10,31,10
,3,11,13,11,26,11,16,12,20,12,23,13,27
,13,9,14,13,14,30,15
  500 DATA24,16,2,17,28,17,6,18,12,18,
16,18,25,18,9,19,14,19,18,19,23,20,29,
20,19,21,16,22,18,22,12,23,14,23,20,23
,30,25,17,26,7,27,19,27,26,27,0,28,19,
29,28,29,4,30,17,30,13,31,29,31
  510 REM Cars Data
  520 DATA1,4,30,10,18,13,14,16,6,21,2
6,21,2,31,25,21
  530 DEFPROCassem:DIMQ%2000,maze 1030
,Rocks%(60):IFINKEY-256=1timer=&29F EL
SEtimer=&2A0
  540 fuelc=&90:scr=&70:dat=&72:ad=&74
:FORP=0TO2STEP2:P%=Q%:[OPTP
  550 .print LDX#2:.prlp1 LDY#15:.prlp
2 LDA(dat),Y:STA(scr),Y:DEY:BPLprlp2
  560 LDAdat:CLC:ADC#16:STAdat:LDAscr:
CLC:ADC#&40:STAscr:LDAscr+1:ADC#1:STAs
cr+1:DEX:BNEprlp1:RTS
  570 .carx EQUB0:.cary EQUB0:.mazex E
QUB0:.mazey EQUB0:.windad EQUW0:.wncnx
EQUB0:.wncny EQUB0
  580 .calc LDA#0:STAad+1:TYA:LDY#5:.r
olp ASLA:ROLad+1:DEY:BNErolp:STAad:TXA
:CLC:ADCad:STAad:LDAad+1:ADC#0:STAad+1
:LDAad:CLC:ADC#maze MOD256:STAad:LDAad
+1:ADC#maze DIV256:STAad+1:RTS
  590 .window LDA#19:JSR&FFF4:LDAcarx:
SEC:SBC#5:STAmazex:LDA#&90:STAwindad:L
DA#&5F:STAwindad+1
  600 LDA#11:STAwncnx:.winxlp LDA#11:S
TAwncny:LDAwindad:STAscr:LDAwindad+1:S
TAscr+1:LDAcary:SEC:SBC#5:STAmazey
  610 .winylp LDA#9:STAdat+1:LDAmazex:
CMP#32:BCCchkylm:.block LDA#&A0:STAdat
:JSRprint:JMPnxtblk
  620 .chkylm LDAmazey:CMP#32:BCCchkca
r:JMPblock:.chkcar LDAwncnx:CMP#6:BNEp
rwom:LDAwncny:CMP#6:BNEprwom:LDAcardir
:STAdat:JSRprint:JMPnxtblk
  630 .prwom LDXmazex:LDYmazey:JSRcalc
:LDY#0:LDA(ad),Y:STAdat:JSRprint
  640 .nxtblk INCmazey:DECwncny:BNEwin
Ylp:LDAwindad:CLC:ADC#16:STAwindad:LDA
windad+1:ADC#0:STAwindad+1:INCmazex:DE
Cwncnx:BNEwinXlp:RTS:.winYlp JMPwinylp
:.winXlp JMPwinxlp
  650 .cardir EQUB0:.newcx EQUB0:.newc
y EQUB0:.newcd EQUB0
  660 .mvcar LDA#&81:LDX#&9E:LDY#&FF:J
SR&FFF4:TYA:BEQncdl:LDA#&20:STAnewcd:J
MPcarm
  670 .ncdl LDA#&81:LDX#&BD:LDY#&FF:JS
R&FFF4:TYA:BEQncdr:LDA#&40:STAnewcd:JM
Pcarm
  680 .ncdr LDA#&81:LDX#&B7:LDY#&FF:JS
R&FFF4:TYA:BEQncdu:LDA#&60:STAnewcd:JM
Pcarm
  690 .ncdu LDA#&81:LDX#&97:LDY#&FF:JS
R&FFF4:TYA:BEQcarm:LDA#&80:STAnewcd
  700 .carm LDAnewcd:CMP#&20:BNEnleft:
LDXcarx:DEX:LDYcary:JMPcheck
  710 .nleft CMP#&40:BNEnright:LDXcarx
:INX:LDYcary:JMPcheck
  720 .nright CMP#&60:BNEnup:LDXcarx:L
DYcary:DEY:JMPcheck
  730 .nup LDXcarx:LDYcary:INY
  740 .check CPX#32:BCSdntmv:CPY#32:BC
Sdntmv:STXnewcx:STYnewcy:JSRcalc:LDY#0
:LDA(ad),Y:CMP#&A0:BEQdntmv:CMP#0:BEQf
ahr:CMP#&E0:BNEnflg
  750 LDA#7:LDX#flgso MOD256:LDY#flgso
DIV256:JSR&FFF1:JSRflagp:JMPaflp
  760 .flagp LDX#0:.flhl LDAflghed,X:J
SR&FFEE:INX:CPX#7:BNEflhl:SED:SEC:LDAf
lgdec:SBC#1:STAflgdec:CLD:JMPpbyt
  770 .aflp LDA#0:TAY:STA(ad),Y:JSRins
c:JSRpscor:DECflags:LDAflags:BNEfahr:L
DA#&E0:STAdead:JMPfahr
  780 .nflg STAdead:RTS
  790 .fahr LDAnewcx:STAcarx:LDAnewcy:
STAcary:LDAnewcd:STAcardir
  800 .dntmv LDAnewcd:CMPcardir:BEQdnt
ti:LDAcardir:STAnewcd:JMPcarm:.dntti R
TS
  810 .flgdec EQUB0:.flags EQUB0:.scor
e EQUW0:.sched EQUB31:EQUB1:EQUB2:EQUB
17:EQUB0:EQUB17:EQUB130:.flghed EQUB31
:EQUB15:EQUB6:EQUB17:EQUB0:EQUB17:EQUB
130
  820 .insc SED:LDAscore:CLC:ADC#1:STA
score:PHP:LDAscore+1:ADC#0:STAscore+1:
PLP:CLD:BCCnel:LDA#100:STAdead:.nel RT
S
  830 .pscor LDX#0:.pscl LDAsched,X:JS
R&FFEE:INX:CPX#7:BNEpscl:LDAscore+1:JS
Rpbyt:LDAscore:JSRpbyt:LDA#&B:JMP&FFEE
  840 .pbyt TAX:LSRA:LSRA:LSRA:LSRA:JS
Rnib:TXA:AND#&F:.nib CLC:ADC#&B:JMP&FF
EE
  850 .enms EQUB0:.enmx EQUD0:EQUD0:.e
nmy EQUD0:EQUD0:.enmpt EQUB0:.seed EQU
B RND(256)
  860 .mvenms LDXenms:STXenmpt:.enmlp
LDAseed:ROLA:ROLA:ROLA:SEC:ADCseed:EOR
&240:STAseed:AND#3:BNEdcdar
  870 .chdir LDAenmy,X:TAY:LDAenmx,X:T
AX:JSRcalc:LDY#0:LDA(ad),Y:CMP#&20:BEQ
vert:CMP#&40:BEQvert
  880 .horiz JSRltrt:BCCnxten:JSRupdn:
JMPnxten
  890 .vert JSRupdn:BCCnxten:JSRltrt:J
MPnxten
  900 .dcdar JSRmove:BCCnxten:LDXenmpt
:JMPchdir
  910 .nxten LDXenmpt:DEX:STXenmpt:BPL
enmlp:RTS
  920 .ltrt LDXenmpt:LDAenmx,X:CMPcarx
:BCSenlt
  930 JSRright:BCCcmr:JSRleft:.cmr RTS
  940 .enlt JSRleft:BCCcml:JSRright:.c
ml RTS
```

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```
 950 .left LDA#&20:STA(ad),Y:JMPmove
 960 .right LDA#&40:STA(ad),Y:JMPmove
 970 .updn LDXenmpt:LDAenmy,X:CMPcary
:BCSenup
 980 JSRdown:BCCcmd:JSRup:.cmd RTS
 990 .enup JSRup:BCCcmu:JSRdown:.cmu
RTS
1000 .up LDA#&60:STA(ad),Y:JMPmove
1010 .down LDA#&80:STA(ad),Y
1020 .move LDXenmpt:LDAenmy,X:TAY:LDA
enmx,X:TAX:JSRcalc:LDY#0:LDA(ad),Y:LDX
enmpt:CMP#&20:BNEntlt
1030 LDAenmx,X:STAnewcx:DECnewcx:LDAe
nmy,X:STAnewcy:JMPen
1040 .ntlt CMP#&40:BNEntrt:LDAenmx,X:
STAnewcx:INCnewcx:LDAenmy,X:STAnewcy:J
MPen
1050 .ntrt CMP#&60:BNEntup:LDAenmx,X:
STAnewcx:LDAenmy,X:STAnewcy:DECnewcy:J
MPen
1060 .ntup LDAenmx,X:STAnewcx:LDAenmy
,X:STAnewcy:INCnewcy
1070 .en LDAnewcx:CMP#32:BCSdmen:LDAn
ewcy:CMP#32:BCSdmen:LDAad:STA&82:LDAad
+1:STA&83:LDXnewcx:LDYnewcy:JSRcalc:LD
Aad:STA&80:LDAad+1:STA&81:LDA&52:STAad
:LDA&83:STAad+1
1080 LDXenmpt:LDY#0:LDA(&80),Y:BNEdme
n:LDA(ad),Y:STA(&80),Y:LDA#0:STA(ad),Y
:LDAnewcx:STAenmx,X:LDAnewcy:STAenmy,X
:CLC:RTS
1090 .dmen SEC:RTS
1100 .fuelf EQUB0:.fuelt EQUB4
1110 .fuel DECfuelt:BE0dfu:RTS:.dfu L
DAfuelc+1:CMP#&78:BCCntbp:LDA#7:LDX#be
ep MOD256:LDY#beep DIV256:JSR&FFF1
1120 .ntbp LDA#4:STAfuelt:LDYfuelf:LD
A#0:STA(fuelc),Y:INY:STYfuelf:CPY#8:BE
Qnxlin:RTS
1130 .nxlin LDY#0:STYfuelf:LDAfuelc:C
LC:ADC#&40:STAfuelc:LDAfuelc+1:ADC#1:S
TAfuelc+1
1140 LDAfuelc:CMP#&E0:BNEnoof:LDAfuel
c+1:CMP#&78:BNEnoof:LDA#&FF:STAdead:.n
oof RTS
1150 .beep EQUW2:EQUW-15:EQUW150:EQUW
1:.flgso EQUW1:EQUW2:EQUW50:EQUW5
1160 .esc LDA#27:STAdead:LDA#126:JMP&
FFF4:.pause LDA#&81:LDX#&A6:LDY#&FF:JS
R&FFF4:TYA:BEQpause
1170 .main LDA#241:STAtimer:LDA#0:STA
dead
1180 .mainloop LDA#&81:LDX#&8F:LDY#&F
F:JSR&FFF4:TYA:BNEesc:LDA#&81:LDX#&96:
LDY#&FF:JSR&FFF4:TYA:BNEpause
1190 JSRmvcar:JSRmvenms:JSRfuel:LDAde
ad:BNEdie:LDXcarx:LDYcary:JSRcalc:LDY#
0:LDA(ad),Y:STAdead:JSRwindow:JSRwait:
LDAdead:BEQmainloop:.die JSRwindow:RTS
1200 .wait BITtimer:BMIwait:LDA#241:S
TAtimer:RTS
1210 .dead EQUB0:.speed EQUB246
1220 .dither LDA#0:STAscr:LDA#&58:STA
scr+1:.dlp LDY#0:LDA#10:STA(scr),Y:INY
:LDA#5:STA(scr),Y:LDAscr:CLC:ADC#2:STA
scr:LDAscr+1:ADC#0:STAscr+1:CMP#&80:BC
Cdlp:RTS
1230 .event LDA#&81:LDX#&AE:LDY#&FF:J
SR&FFF4:TYA:BEQnson:LDA#0:STA&262:RTS
1240 .nson LDA#&81:LDX#&EF:LDY#&FF:JS
R&FFF4:TYA:BEQnsoff:LDA#1:STA&262:.nso
ff RTS
1250 ?NEXT:?&220=event MOD256:?&221=e
vent DIV256:*FX14 4
1260 ENDPROC
1270 DEFPROCgraphics:RESTORE1290:FORN
```

```
%=&900T0&A1FSTEP4:READ!N%:NEXT:ENDPROC
1280 REM Graphics Data
1290 DATA&0,&0,&0,&0,&0,&0,&0,&0,&600
0000,&FFF99E8E,&373707080,&7DFFF3F3,&8E
9EF9FF,&6,&F3F3FF7D,&73737
1300 DATA&CECED0E00,&EBFFFCFC,&6000000
,&FFF99717,&FCFCFFE8,&ECECE,&1797F9FF,
&6,&171733333,&313131117,&8E8ECCCC,&C8C8
C88E,&3D312121,&7F7E7E7F,&CBC84848,&EF
E7E7EF
1310 DATA&7F7E7E7F,&21213130,&EFE7E7E
F,&4848C8CB,&173131131,&333317117,&8EC8C
8C8,&CCCCC8E8E,&CDCDCD,&E0E0E,&1D1D10,&
E0E0E0E0,&7777777,&8B8B8B,&70707,&B3B3B3
1320 DATA&3010101,&16120303,&4A860C08
,&E0E2C2C,&2F4F0707,&3171F1F,&F0F4B87,
&C0E0F0F,&70704000,&40707070,&C0000000
,&C0F0,&4040404,&F040404,&0,&8000000
1330 DATA&3010101,&3D3454A1A,&41040202
,&C2E0D249,&25341E30,&8080D4B,&2044848
4,&80B0929
1340 DEFPROCinst:COLOUR1:PRINTTAB(4,1
)"RALLY DRIVER":COLOUR3:PRINTTAB(3,3)"
By A. Houghton":COLOUR2
1350 PRINT"Guide your rally cararou
nd the maze,"avoiding the rocks"an
d enemy cars."
1360 PRINT"Collect all the"flags be
fore your"fuel runs out to"pick up
 a bonus."
1370 COLOUR3:PRINT"  CONTROLS:-"
1380 COLOUR1:PRINT"Z - LEFT   X - RI
GHT* - UP     / - DOWN"
1390 COLOUR3:PRINT"S/Q - Sound On/Of
f"COPY - Freeze"DELETE - Unfreeze"
"ESCAPE - End Game"
1400 COLOUR2:PRINT"Extra life every"
" 1000 points."
1410 COLOUR3:PRINTTAB(0,30);:ENDPROC
```


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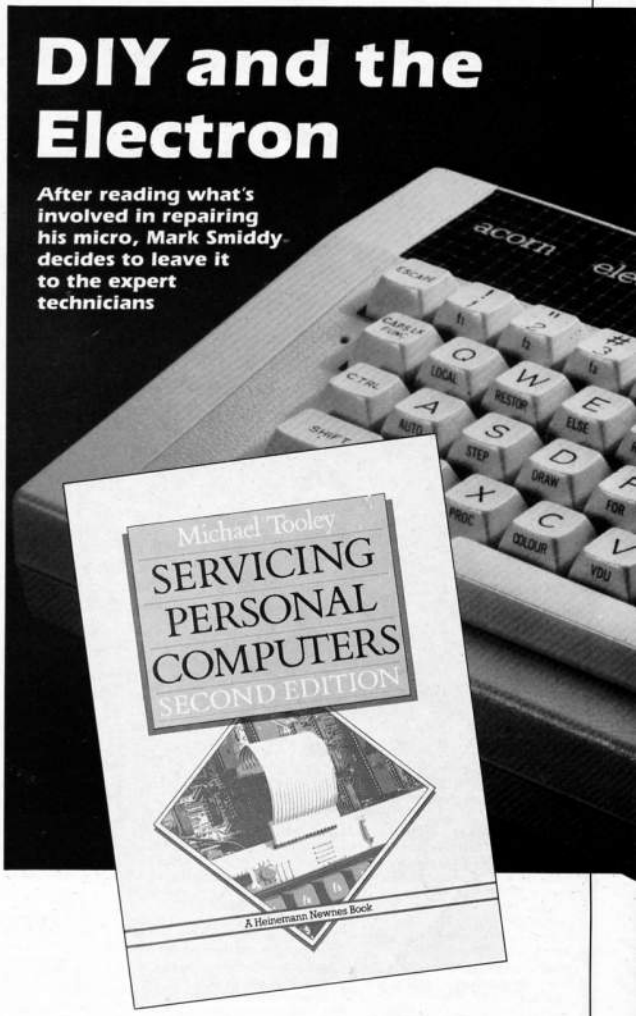
DIY and the Electron

After reading what's involved in repairing his micro, Mark Smiddy decides to leave it to the expert technicians



TODAY's computers are, to say the least, very complex. Printed circuit boards packed with custom chips, dozens of discrete components and thousands of connections. The Electron is no exception. At its heart beats the 6502 8-bit microprocessor surrounded by a box full of support chips – and custom designed monsters like the ULA.

With this sort of complexity, it's surprising how reliable the Electron is, but on rare occasions something fails, even with the extremely sophisticated quality control systems used by Acorn. So what do you do if it does go wrong?

The problem lies in the fact that computers are integrated machines, and if one tiny part fails the whole machine is quite likely to go dead. No matter how competent you are with a soldering iron and a multimeter, fishing around willy-nilly inside the case is almost certain to result in more damage than was initially present.

There are two answers: Take it to a repair shop and get charged an arm and both legs for replacing a burnt out bridge rectifier, or find the fault and fix it yourself – properly. I'm not suggesting you do this without guidance of course, and this is where Michael Tooley's book comes in.

Right from the word "phut" – before you pick up your tools – the book gives the budding repairman a lesson in what he is about to fix. The first chapter contains a technical description of how computers work – at electronic level. This is fairly heavy going and not for the faint-hearted, but it is vital the principles are understood, in part at least, before any repairs are attempted.

Topics covered include simple microprocessor block and timing diagrams, logic paths, multiplexing, Mos technology, programming, input/output including a full RS232 set-up, and raster scan displays. Also to be found here are the full pin-outs of several microprocessors including the 6502 and most of the common support chips. For the more important chips, each pin-out has been given a clear description.

And if that was not enough, there's a vast number of diagrams showing parts of working systems – address decoding, for instance. Even though not all of this appertains to the Electron, the book explains the principals – after all that's what counts.

If the first chapter is meant to put you off intellectually, the second must surely be designed to give your bank manager heart-failure. Seriously though, it talks of equipping your workshop with the correct tools and test gear, some of which can run into hundreds of pounds, although they can usually be borrowed from another friendly electronics buff.

Not content with just listing the required tools, the author includes examples of their use and what readings to expect.

The next 41 pages are spent on an essential skill in repair work – fault diagnosis. This starts once again with the principals of the technique and quickly marches through individual test procedures – how to do them, what to poke and what reading to expect while you're poking it.

Chapter four covers disc drive faults in great detail and concludes with a superb fault diagnosis guide. Likewise, chapter five includes full test, fault diagnosis and repair of printers and monitors.

The section on monitors is a little lacking for colour systems and TVs. That said, messing around in monitors should only be done if you're aware of the lethal voltages inside the case. The basic safety rules are not emphasised enough here.

The whole thing concludes with a nice, but not altogether concise reference section, most of the contents being reiterated in the better electronic supply catalogues like Maplin and Radio Spares. The index is better than average – listing references to part numbers as well as the usual buzzwords.

This is not the sort of book for a bedtime read – nor is it meant for a complete beginner. However, anyone with some knowledge of electronics should be able to grasp most of the text fairly easily. If nothing else, it might show you that fixing your Electron is a job that really should be left to an expert.

For anyone at college studying for an ONC or higher in computing, this book is highly recommended.

Product: Servicing Personal Computers
Price: £20
Supplier: Heinemann Professional Publishing Ltd, Halley Court, Jordan Hill, Oxford OX2 8EJ.
Tel: 0865 311366

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

Finalist for the Home Software of the Year Award

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Contains 32 page booklet giving clear, easy-to-follow instructions on all 4 programs

Word Processor: Ideal for writing letters and reports. There is a constant display of both time and word count, plus a words-per-minute display to encourage the budding typist! A unique feature is the double-size text option in both edit and printer mode — perfect for young children and people with poor vision.

Database: You use this for storing information, just like an office filing cabinet. Facts you have entered can be quickly retrieved by just keying in a word or part of a word. They can be sorted, replaced, saved for future use or printed out.

Spreadsheet: Enables you to use your micro for home accounts or pocket money records. It creates a display of numbers in rows and columns. Continuous updating is possible, and a changed figure can be instantly reflected throughout the rest of the spreadsheet. Your results can be saved, to be used for future updates, or can be fed into its associated program . .

Graphics: Part of the spreadsheet section, it lets you draw bar charts, pie charts and histograms to give a graphic presentation of your statistics. Helps to give life and colour to the dullest figures!

☆ **Word Processor** ☆ **Spreadsheet**
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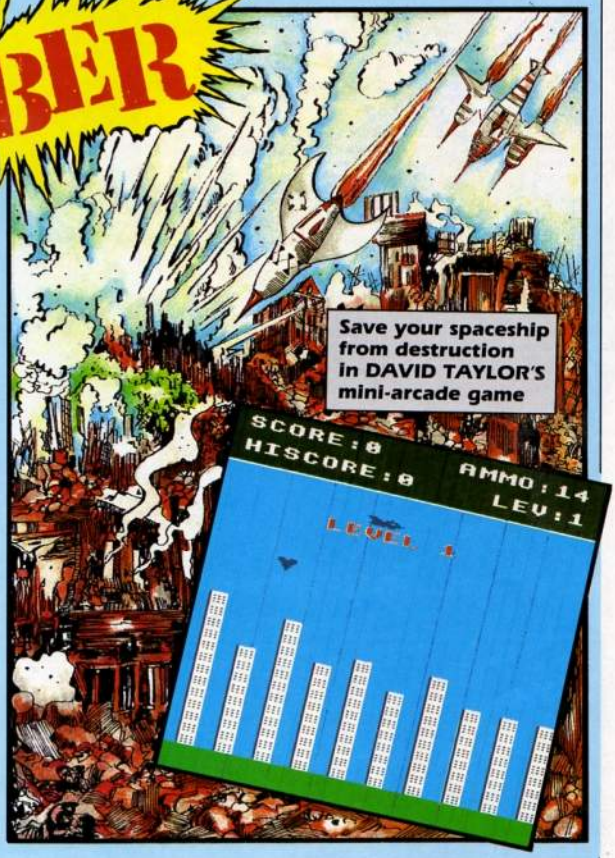
BOMBER



YOU are out patrolling the asteroid belt beyond Mars hot on the trail of intergalactic pirates when your trusty old spaceship, deep space destroyer Spud 1, is hit by a large chunk of debris while taking evasive action during a violent meteor storm.

Badly damaged, you manage to limp to the nearest planet, Mars, and descend through the dusty upper stratosphere. Your fuel tanks have been ruptured causing valuable rocket fuel to leak away, and you are rapidly losing altitude.

There's no time to scout around for a suitable landing pad – it's got to be right here and now, or you can kiss your pension goodbye.

The bad news is that there is a large city below and nowhere to set down. The good news is that it's one of the early Mars settlements that have long since been abandoned.

Luckily your cargo hold is full of high explosive – confiscated pirates' booty – so, you decide to flatten the buildings below and create your own landing pad.

You are descending rapidly and getting closer and closer to the tops of the skyscrapers. As you fly over each one you must drop a cannister of high exposive and flatten it. If you succeed you'll be transported to the next screen where the buildings are even higher and the mission much tougher.

The only control key used throughout the game is the spacebar. Use it to start and when flying over the city, to drop bombs. Displayed at the top of the screen is your score, the current high score, the number of bombs left and the difficulty level.

```
  10 REM Bomber
  20 REM By David Taylor
  30 REM (c) Electron User
  40 MODE2
  50 VDU 23,224,32,248,204,255,252,11
2,0,0,23,225,240,124,63,63,127,63,0,0,
23,226,231,255,255,126,60,60,24,24,23,
227,255,255,255,255,255,255,255,255,23
,228,127,127,85,127,85,127,85,127,23,1
,0;0;0;0;
  60 HX=0:SX=0:LX=1
  70 XX=0:YX=6
  80 AX=15:BX=0
  90 BX=0:BY=6:CX=0
 100 COLOUR 7
 110 VDU 19,9,9;0;
 120 COLOUR 134:CLS
 130 VDU 28,0,31,19,29
 140 COLOUR 130:CLS
 150 VDU28,0,4,19,0
 160 COLOUR 128:CLS
 170 VDU 26
 180 PRINT TAB(1,1);"SCORE:";SX;TAB(1
2,1);"AMMO:";AX;TAB(1,3);"HISCORE:";HX
;TAB(14,3);"LEV:";LX
 190 MOVE0,864:DRAW1279,864:DRAW1279,
1023:DRAW0,1023:DRAW0,864
 200 COLOUR 132
 210 FOR A=1 TO 19 STEP 2
 220 RX=28-(5+LX+RND(6))
 230 FOR B=28 TO RX STEP-1
 240 PRINT TAB(A,B);CHR$(228)
 250 NEXT
 260 NEXT
 270 COLOUR 134:COLOUR 9
 280 PRINT TAB(3,8);"SPACE TO PLAY"
 290 REPEAT UNTIL GET
 300 PRINT TAB(3,8);"  LEVEL ";LX;"
"
 310 FOR A=0 TO 999:NEXT
 320 VDU 19,9,6;0;
 330 SOUND 1,1,200,1
 340 COLOUR 4:PRINT TAB(XX,YX)CHR$225
;CHR$224
 350 IF POINT((XX*64)+160,(31-YX)*32)
=7 OR XX=19 AND POINT(96,(30-YX)*32)=7
 CX=1:FOR A=50 TO 0 STEP-1:SOUND 1,1,A
,1:NEXT:PRINT TAB(5,10)"GAME OVER":FOR
 A=1 TO 2000:NEXT:IF SX>HX HX=SX
 360 IF CX=1 LX=1:SX=0:GOTO 70 ELSE I
F BX=1 OR AX=0 OR YX>=28 GOTO 370 ELSE
 IF INKEY-99 BX=XX:BY=YX+1:BX=1:AX=AX-
1:COLOUR 128:COLOUR 7:PRINT TAB(17,1)"
 "TAB(17,1);AX:COLOUR 134
 370 IF BX=1 COLOUR4:PRINTTAB(BX,BY)C
HR$226
 380 IF YX=28 AND XX=9 SX=SX+(100+(AX
*10)):COLOUR 11:PRINT TAB(5,8)"WELL DO
NE !"TAB(2,10)"LEVEL ";LX;" COMPLETED"
:LX=LX+1:FOR A=70 TO 100 STEP3:SOUND 1
,1,A,1:NEXT:SOUND 1,1,90,4:SOUND 1,1,1
10,4:SOUND 1,1,90,8:FOR A=0 TO 3000:NE
XT:GOTO70
 390 K$=INKEY$(2)
 400 IF BX=1 COLOUR6:PRINT TAB(BX,BY)
CHR$226:BY=BY+1:IF BY=29 BX=0
 410 COLOUR 6:PRINT TAB(XX,YX)CHR$225
;CHR$224:XX=XX+1:IF XX=20 XX=0:YX=YX+1
 420 GOTO 330
```

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